FIRST LOOK Microsoft's new Internet Explorer 5 Web browser can be customized in unprecedented ways. Page 37.

JOBS PULLS A LINUX Apple server going open source, but commercial version still $500, and key pieces remain proprietary. Page 15.

The newsweekly of enterprise network computing

NetworkWorld

March 22, 1999 Volume 16, Number 12

The network portal: www.nwfusion.com

New SET to go. Page 18.

AT&T'S BIG FIX

BY LATON MCCARTNEY

CEO Armstrong: high marks for crisis handling.

One year later: A behind-the-scenes look at the causes of and fallout from AT&T's devastating frame relay outage.

April 13, 1998, is a day that neither AT&T nor many of its big customers will soon forget.

That, of course, was the date AT&T's frame relay network went down, leaving the company's business customers — including many of the country's largest corporations and financial institutions — without service for more than 24 hours.

Over the past year, AT&T has been dealing with the fallout from the outage and ensuring that the events of April 13 never reoccur. Today, much of its work is complete. The carrier has improved its testing and upgrade procedures and built a separate network to carry the kind of management traffic that caused the outage in the first place.

In order to understand how the company has addressed its network problems, it's necessary to go back 12 months and examine exactly what went wrong — and why.

See AT&T, page 53

Lucent hardball

Company's aggressive patent-enforcement group files lawsuits, demands royalties.

BY DAVID ROHDE

LIBERTY CORNER, N.J. — Ordinarily, Lucent never misses an opportunity to flaunt its distinctive red logo.

But on a winding road in the tiny hamlet of Liberty Corner, N.J, you won't find the Lucent emblem beckoning you. You'll just see a sign listing Lucent among six companies sharing an office building.

Don't worry if you miss the structure. Lucent doesn't have anything to sell you here, unless you're a vendor seeking the privilege of paying Lucent a royalty to keep the company from suing you.

Welcome to the home of Lucent's Intellectual Property group, where scores of lawyers and engineers pore over the IT industry's product materials in search of violations of Lucent's treasure chest of Bell Labs patents. Since Lucent spun off from AT&T, the patent group has demanded royalties or other compensation from hundreds of other vendors. Some

See **Patents**, page 75

Exclusive online coverage

- Details on Lucent patent group.
- Find out why Lucent files most of its patent cases in Wilmington, Del.
- How did a verbal sparring match in court between Lucent and Newbridge turn out?
- Why is Lucent's Bill O'Shea so hard to find?
- Read about Lucent's intellectual property strategy.

FIND IT DocFinder 2138 ON FUSION www.nwfusion.com

STEVE SKOLL

Michael Greene, chief operating officer, Lucent's Intellectual Property group

3Com users not converged quite yet

BY JIM DUFFY

SANTA CLARA, CALIF. — Don't throw away that PBX yet.

The move to voice/data convergence is going to take a long, long time, users at a 3Com convergence event said last week. Standards, interoperability and reliability issues still have to be addressed before users can make a full transition to packetized voice networks.

"It's not here today; it's not ready today," says David Channin, assistant professor and chief of imaging informatics at Northwestern University Medical School's department of radiology in Chicago. "But the industry's going to

See **3Com**, page 77

800

Newspaper $5.00

Voice-over-IP camps wrestle over standards

BY SANDRA GITTLEN AND DENISE PAPPALARDO

MINNEAPOLIS — The Internet Engineering Task Force (IETF) is working on specifications that will ensure IP networks of the future will be able to handle voice calls as reliably as today's public switched telephone network (PSTN).

At last week's Minneapolis meeting, IETF members debated whether to preserve the PSTN's native signaling protocols, including SS7, or create new IP control protocols.

Specifically, the Signal Trans-

See **IETF**, page [illegible]

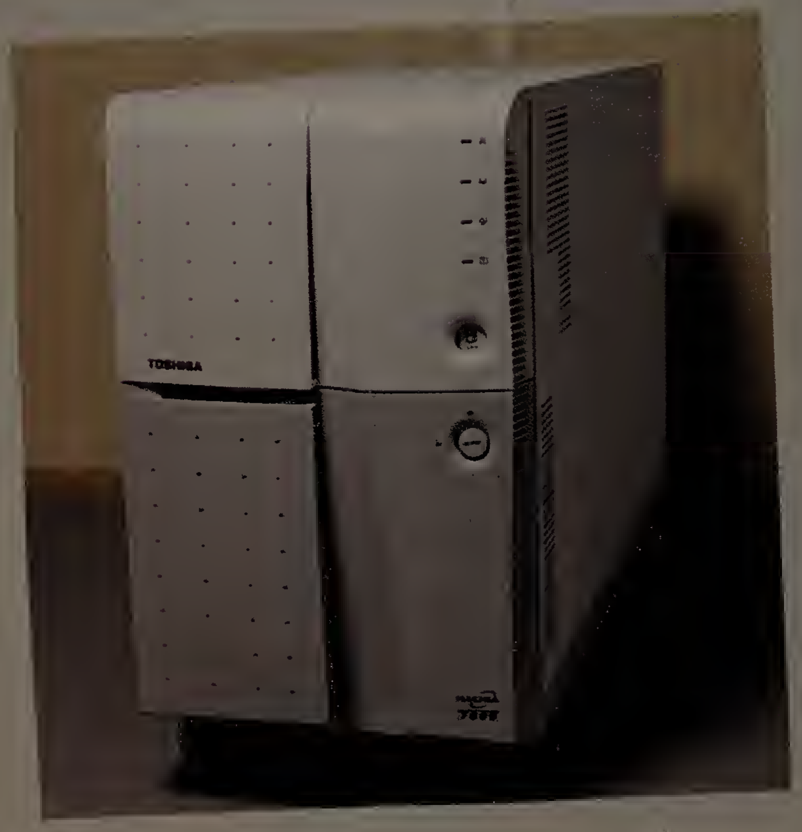
Toshiba ju ps into server arket

PUTERS: "The M eries is a perfect ent provide test and most powerful technology

that customers can benefit fro and in the future," said Friederichs, vice pres marketing, TAIS, CSD. Magnia® 7000 server off combination of perf scaleability to add the enterpri

Experience Reliability Redundant power systems, Error Correction Code memory and drives you can exchange while the server is active help maximize uptime and productivity. Built-in instrumentation, Intel LANDesk Server Management software and compatibility with enterprise management solutions help keep IT managers in control. Toshiba specially designed software additions that delivers proactive monitoring of hard disk drive, power supplies and cooling fans. For more information, go to www.manageability.toshiba.com. The Magnia 7000 series is part of a family of Toshiba servers that software and patibility They also provide 24-hou

+ OPTIONAL LOAD SHARING
REDUNDANT COOLING FAN



TOWER OR RACK!

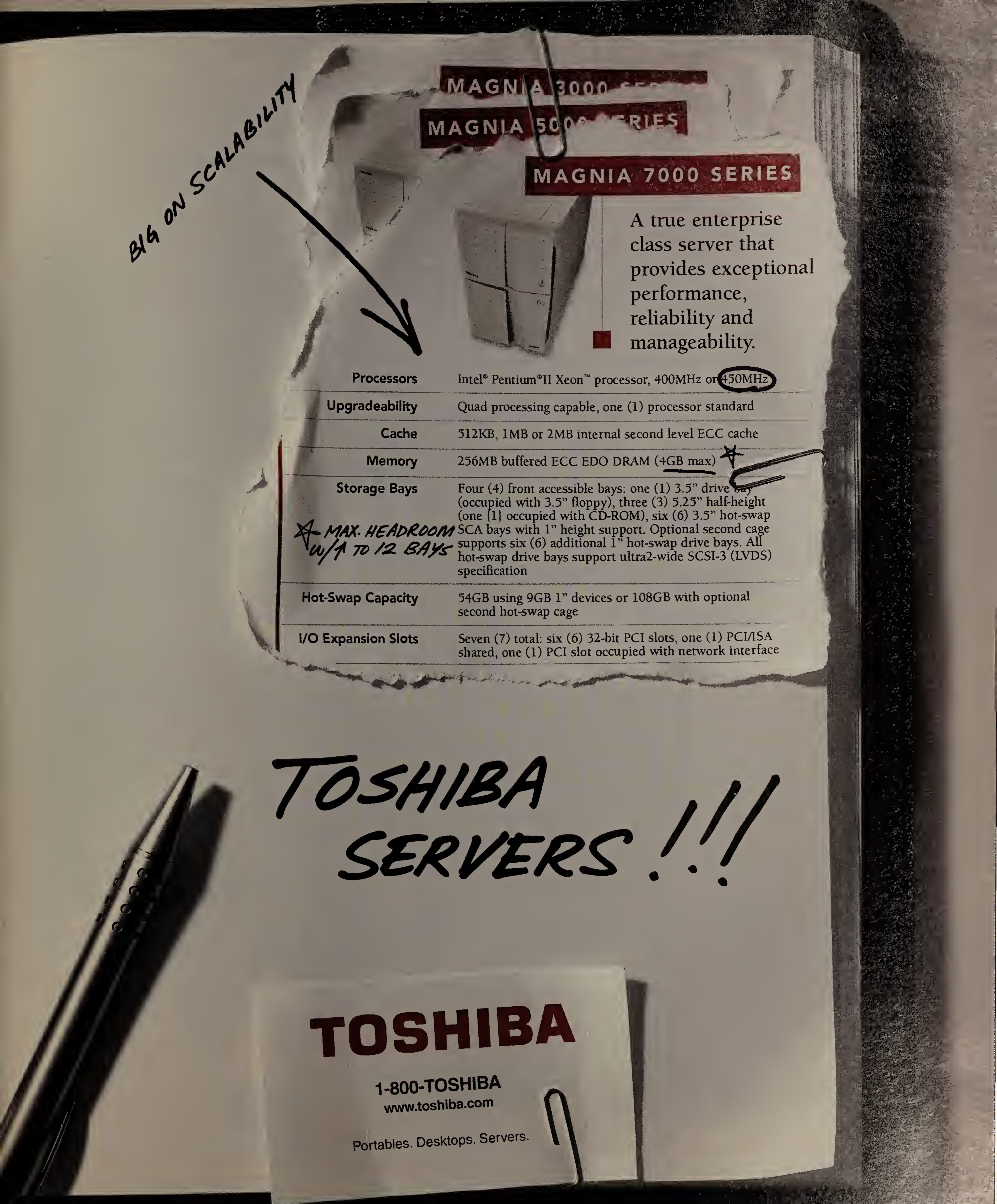
HIGH AVAILABILITY

ROBUST
INTEL BASED
SERVER

W/↑ TO 4 HOT SWAP REDUNDANT
POWER SUPPLIES = LESS DOWNTIME

intel inside
pentium® II
xeon™
PROCESSOR

©1999 Toshiba America Information Systems, Inc. The Intel inside logo and Pentium are registered trademarks and Pentium II Xeon is a trademark of Intel Corporation. All other products and names mentioned are the property of their respective companies. All specifications and availability are subject to change. All rights reserved.



BIG ON SCALABILITY

MAGNIA 3000

MAGNIA 50 ERIES

MAGNIA 7000 SERIES

A true enterprise class server that provides exceptional performance, reliability and manageability.

Processors	Intel® Pentium®II Xeon™ processor, 400MHz or 450MHz
Upgradeability	Quad processing capable, one (1) processor standard
Cache	512KB, 1MB or 2MB internal second level ECC cache
Memory	256MB buffered ECC EDO DRAM (4GB max) ☆
Storage Bays	Four (4) front accessible bays: one (1) 3.5” drive bay (occupied with 3.5” floppy), three (3) 5.25” half-height (one (1) occupied with CD-ROM), six (6) 3.5” hot-swap SCA bays with 1” height support. Optional second cage supports six (6) additional 1” hot-swap drive bays. All hot-swap drive bays support ultra2-wide SCSI-3 (LVDS) specification
Hot-Swap Capacity	54GB using 9GB 1” devices or 108GB with optional second hot-swap cage
I/O Expansion Slots	Seven (7) total: six (6) 32-bit PCI slots, one (1) PCI/ISA shared, one (1) PCI slot occupied with network interface

☆ MAX. HEADROOM W/1 TO 12 BAYS

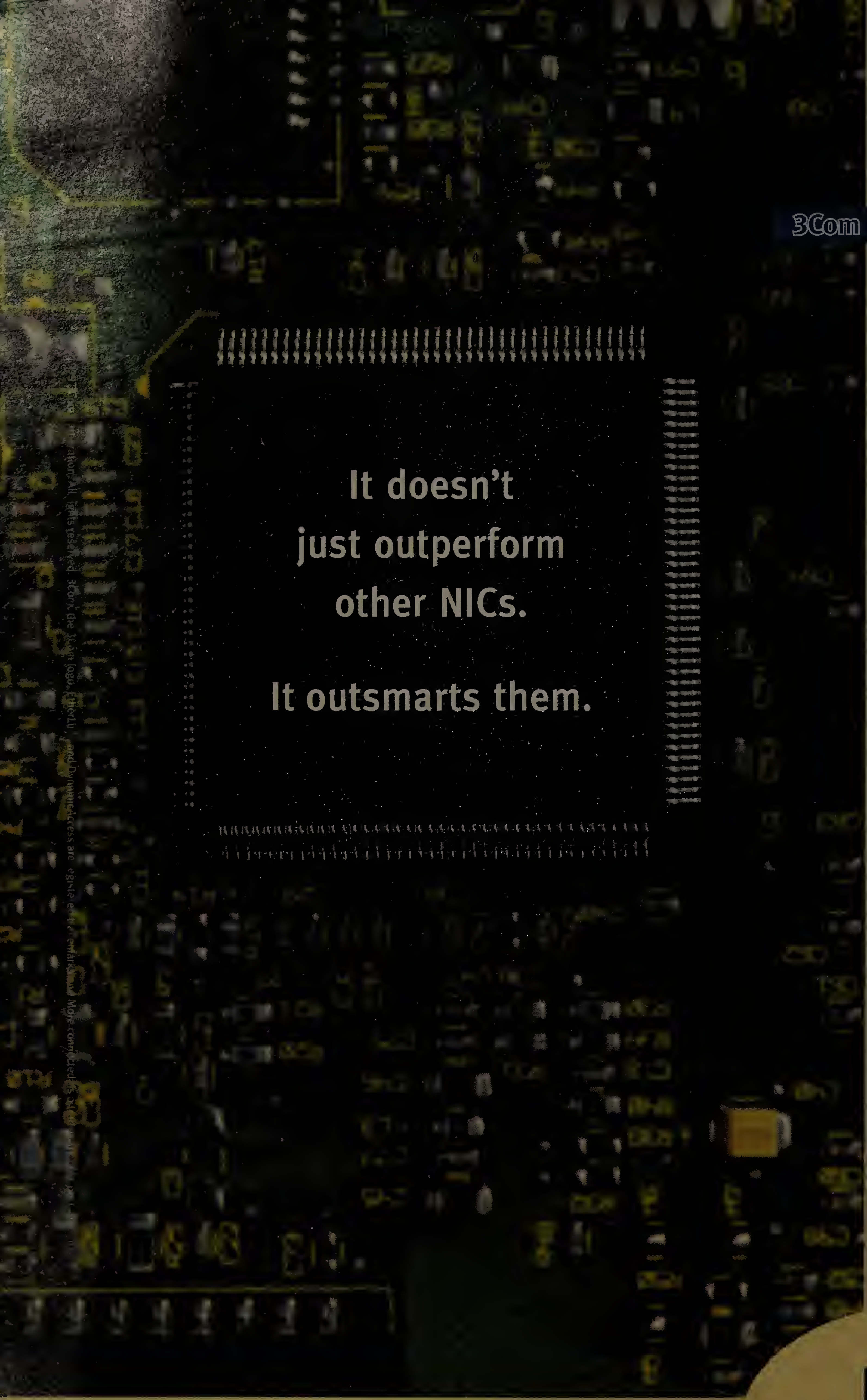
TOSHIBA SERVERS !!!

TOSHIBA

1-800-TOSHIBA
www.toshiba.com

Portables. Desktops. Servers.

Free Product info enter NWInfoXpress #76 online @ **www.networkworld.com/infoxpress**



It doesn't just outperform other NICs.

It outsmarts them.

3Com EtherLink

Now the fastest NICs are also the smartest. That's because 3Com® desktop and server NICs raise the IQ of your entire network. Standards-based Dynamic*Access*® technology adds intelligence to 3Com NICs for effective solutions to complex IS problems. Traffic Prioritization lets you optimize the network to support business critical applications. Resilient Server Links ensure that your server stays connected. And Load Balancing guarantees higher bandwidth between the server and the switch.

Plus, 3Com NICs lower your total cost of ownership. They include complete PC management features so you can manage PC resources from a central location, even if a PC can't boot. And they support virtually every operating system and management application, not just a few. So you can bring intelligence to your network today, without worrying about what will happen in the industry tomorrow.

What's more, 3Com "thinking NICs" are Y2K compliant and ready for evaluation right now. So visit www.3com.com/outsmart/nics for more information and the facts about our special evaluation offers. Because there's no smarter way to increase the performance of your network.

3COM DESKTOP AND SERVER NICS.

3Com® More connected.™

Corporation. All rights reserved. 3Com, the 3Com logo, EtherLink, and DynamicAccess are registered trademarks and More connected. is a [illegible]

NetworkWorld Fusion
www.nwfusion.com

THIS WEEK ONLINE

Selecting an ISP. The Motley Fools' techies continue their discussion of how to choose an ISP for your heavy-duty Web site. This week, they show you how to evaluate the proposals you got back from the request for proposal (RFP) they helped you write last week. What, you cut class? Don't worry, we'll link you to the RFP lesson plan, too. **DocFinder: 2140**

Carrier services. Would you trust your voice traffic to a carrier in Bermuda? Fred McClimans says last week's announcement by Global Crossings, located there, that it would buy better-known Frontier could mean some interesting choices for telecom managers on the WAN and even in the local loop. **DocFinder: 2141**

Quality of service. Fusion user Don Niall isn't buying all this talk about QoS on Ethernet LANs. He says most of the work to date has centered on per-port prioritization and has ignored application-based prioritization. And he worries that getting real QoS will require a forklift upgrade. What do you think? **DocFinder: 2142**

Voice/data standards. Last week, Microsoft, Hewlett-Packard and Nortel Networks announced plans to develop standards for voice and telephony integration. See what some readers think of the plans, and add your comments. **DocFinder: 2143**

E-commerce. Two Web start-ups are girding for battle in the market for online steel sales. See how they're doing it. **DocFinder: 2144**

Wireless. Read venture capitalist Todd Dagres' thoughts on the future of wireless technologies. **DocFinder: 2145**

How to get onto Network World Fusion

Click on Register on the home page and follow the instructions. Subscribers, keep your NWF number — highlighted on the front cover's mailing label — handy during registration. Nonsubscribers must fill out an online registration form.

NetworkWorld

Table of Contents

MARCH 22, 1999

CEO David Teplow has made succession planning an integral part of his firm's corporate culture. Page 64.

NEWS

6 Intel bounces NEC from the Pentium III server party.
8 Ascend to launch digital subscriber line modem for offices.
8 Software.com becomes an e-mail heavyweight.
10 Oblix opens Novell Directory Services to end users.
12 Hacker arsenals feature new weapons.
14 Broadjump leaps into broadband management.
14 Global Crossings drops a bundle of stock for Frontier.
15 Apple takes a weak stab at open source.
18 MasterCard, Visa revise e-commerce security.

INFRASTRUCTURE

19 Vinca foolproofs Windows NT failover.
19 2005: A Microsoft odyssey, the final chapter.
25 Kevin Tolly: Technology glut and the network.

CARRIERS & ISPs

31 Remote access has Year 2000 problems.
31 FaxSav's services make IP faxing easier for users.
34 David Rohde: AT&T needs to believe in what it sells.

ENTERPRISE APPLICATIONS

37 A First Look at Internet Explorer 5.
38 Microsoft is readying its new Millennium.
46 Scott Bradner: Walkman or Betamax?

TECHNOLOGY UPDATE

47 Swiss mix boosts backbone convergence.

Special Focus

STARING AT THE Y2K BUG

Users need to double-check home-grown SNA applications. Page 28.

38 Gearhead: Questions and answers on beyond cool.

MANAGEMENT

64 Plan for the worst: Keeping the network running even through the most trying times.

OPINIONS

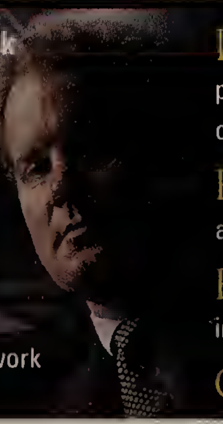
50 Editorial: Attack of the lame start-ups.
51 Jeff Shapiro: Wait for Windows 2000 before you upgrade.
51 Winn Schwartau: Y2K problem or hacker attack?
78 Backspin: Manic magic in Gibbsland.
78 'Net Buzz: "Workplace privacy" is an oxymoron; More 'Net whiz kids.

Net Know-It-All ....Page 14
Ask Dr. Intranet ....Page 47
Message Queue ....Page 50
Editorial and advertiser indexes ......Page 74

HOW TO CONTACT US

WRITE: Network World. 161 Worcester Road, Framingham, MA 01701; **CALL:** (508) 875-6400; **FAX:** (508) 820-3467; **E-MAIL:** nwnews@nww.com; **CIRCULATION:** (508) 820-7444; nwcirc@nww.com; **STAFF:** See the masthead on page 12 for more contact information. **REPRINTS:** (612) 582-3800

FEATURES



AT&T one year later

A behind-the-scenes look at the causes of and fallout from the carrier's devastating frame relay outage. Page 1.

One of AT&T's outage point men: Data Network Services Vice President Joe Lueckenhoff

PREPARED TO BE PROACTIVE: New performance management tools can help you anticipate end-user complaints and nip net problems in the bud. Page 57.

REVIEW: Castanet 4.0 distributes applications easily, securely and reliably over intranets, extranets and the Internet. Page 59.

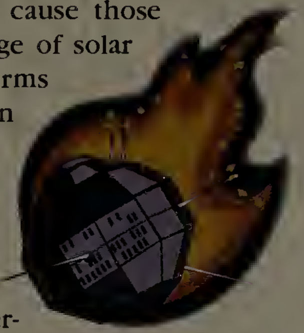
REVIEW: eNTrax Security Suite will help you determine who's invading your turf — to a point. Page 60.

COOL TOOLS: The last modem you'll ever need. Page [illegible]

NEWS BRIEFS, MARCH 22, 1999

And you thought the millennium bug was going to be a problem?

Solar flare activity around year-end could wreak more havoc on satellite systems and power grids than the Year 2000 computer problem may cause those same systems. A surge of solar flares or solar storms that can shut down power grids and burn out satellites is expected to peak in late 1999 and early 2000, said experts at a conference for Y2K planners held last week in England. The last peak in the 11-year solar flare cycle was in March 1989, when surges of atmospheric activity shut down the Hydro-Quebec power grid in Canada, leaving six million people without power for days. Experts believe solar flare activity last year helped knock out the Galaxy 4 satellite, disabling 40 million pagers.



FCC to local carriers: Give competitors some space

The Federal Communications Commission last week slapped new rules on incumbent local exchange carriers (ILEC) that force these carriers to give central-office space to competitors. ILECs must offer competitive local exchange carriers (CLEC) special cages for their own switches, as well as space outside the cages for termination equipment. ILECs must also find additional nearby space when spots inside the central office are exhausted, and they may not require CLEC equipment to meet more stringent safety requirements than those they impose on their own gear.

Intel goes scot-free

The Federal Trade Commission (FTC) last week approved a settlement with Intel, ditching an ongoing inquiry into the company for antitrust violations. Under the agreement, Intel can not withhold technical information from any company it is in dispute with over patents or intellectual property. Each year for the next five years, Intel must file a report detailing its compliance and, if requested by the FTC, open its books to FTC auditors. In addition, the chip giant must send a report to the FTC by mid-April enumerating how it will comply with the agreement. Under the terms of the agreement, Intel admitted to no fault.

Siemens grabs another start-up for its data venture

Siemens last week purchased Redstone Communications, a Westford, Mass., start-up that produces a high-port-density edge switch router for service providers. Terms of the deal were not disclosed. Siemens says Redstone will become part of its new venture, Unisphere Solutions, which is collecting data products from various established and start-up vendors to produce a complete family of IP and converged network offerings (NW, March 15, page 23).

A second swing at Windows 98

Bill Gates last week used the Internet Explorer 5.0 launch to let the world know that Microsoft will be making another run at Windows 98. Windows 98 Second Edition will be available this fall, Gates says. The package's main feature will be an integrated Explorer 5.0 browser. But Second Edition will also include a new dial-up network feature, support for Universal Serial Bus modems and Internet connection sharing. Existing users will get a free upgrade, and new copies will retail for $89.

Netscape, we hardly new ye

So Netscape is no more, at least not in the form that made Navigator a household name and greatly accelerated the commercialization of the Internet. A whopping 99.7% of Netscape shareholders last week gave their formal blessing to the America Online deal, worth around $9 billion. Not bad for a browser company, but not exactly the end Netscape founders had in mind during the heyday of their holy war against Microsoft. As for the details of what AOL intends to do with the Netscape product line, an AOL spokesman says the veil of secrecy will be lifted this week.

Ivy League Web tools

Though known more for its medical school and Ivy League roots, Dartmouth College is also in the software business. The school last week released two network management packages: InterMapper 2.1 and SNMP Watcher 1.0, both for the Macintosh platform. Available commercially since 1996, InterMapper is a multiprotocol network monitoring tool.

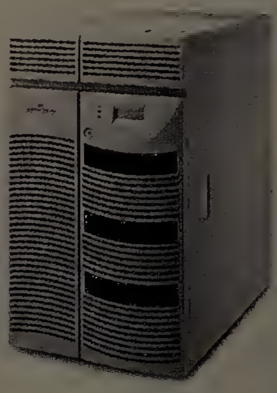
The latest release features clickable image maps that show detailed information about particular devices and their network interfaces, and real-time strip charts for plotting packet, byte and error rates, as well as link utilization. The tools require Macintosh System 7. InterMapper 2.1 is priced at $795, while SNMP Watcher 1.0 costs $99.

Intel bounces NEC from Pentium III server party

BY DENI CONNOR

SAN FRANCISCO — Maybe Intel should have asked Martha Stewart how to plan its party. If it did, the Pentium III server ball may have gone off without a hitch.

Instead, the monster chip maker's celebration of the Pentium III as a server engine was dampened by a miffed NEC, which was uninvited at the last minute from exhibiting its eight-way server, and the grumblings of other partners who were told how, and how not to, debut their own Pentium III wares.



NEC's Express5800 eight-way server

Most of the controversy was generated by Intel's Profusion, a chipset designed for eight-way multiprocessing. It apparently wasn't enough for NEC to support the Pentium III. Intel wanted the Japanese server giant to back Profusion as well. But because NEC chose its own eight-way technology, Intel shut the company out of an important opportunity for publicity. The move is ironic because Intel last week settled its antitrust suit with the Federal Trade Commission (FTC). In the suit, the FTC accused Intel of withholding technical information from other vendors.

An unnamed official at NEC characterizes Intel's withdrawn invitation as typical of the company's heavy-handed tactics. Intel "is sending a message that says, 'Unless you are using Profusion, you aren't *%!#,' " the official says.

Three other vendors that are not using the Profusion chipset — Hitachi, Siemens AG and Fujitsu — also were conspicuous in their absence from the exhibition.

Intel had no comment on the NEC-Profusion controversy.

Intel originally expected the Profusion chipset, which allows eight-way symmetrical multiprocessing and supports up to 32G bytes of memory, to ship in the fourth quarter of 1998. It is now scheduled to ship next quarter.

Despite NEC's position, most U.S. server vendors have lined up behind the Profusion chip set. Dell, Compaq, Hewlett-Packard, Unisys, IBM and other vendors plan to ship eight-way servers once Profusion is available.

NEC, which has its own chip fabrication plant in Japan, is using its Aqua II chipset to power its eight-way servers. Aqua II, according to NEC's claims, is better for large databases and decision-support systems, while machines using the Profusion chipset are better for random online transaction-processing-type traffic. Aqua is 20% to 22% faster than Profusion, NEC claims.

Hitachi has taken the middle road. It licenses the Profusion design from Intel but tweaks the chipset for performance and speed. Hitachi believes that Intel fully accepts its strategy. "In our minds, Intel takes a holistic view of this marketplace. Anything that can sell eight $3,000 processors is a good thing for Intel," says Michael Krieger, a vice president at Hitachi.

Despite the NEC brouhaha, one analyst thinks it wasn't such a big deal because NEC was taking a nonstandard approach. A proprietary chipset "is not a good thing to have within a commoditized market," says Dan Dolan, industry analyst for Dataquest in San Jose.

Further complicating the gala, server vendors were under explicit instructions not to release data on their four- or eight-way plans until the day of the event. HP, Compaq, IBM and Unisys briefed *Network World* reporters early; Data General, Dell, Toshiba and Sequent did not. Some server makers' feathers were ruffled because the Pentium III itself had been previously announced. ◪

Survival Specialist

Name:	Fiona Incledon
Job Description:	Help prevent the loss of a company's critical business functions when disaster strikes.
Experience:	Studied potential effects of a complete system shutdown at a baby formula plant, pinpointing weaknesses in existing backup plans.
Quote:	"Most people don't think about disasters. I'm not most people."
Phone:	1 800 IBM 7777, ask for Services
Web:	www.ibm.com/services/info

IBM Global Services
People who think. People who do. People who get it.

@ business people

IBM, the e-business [illegible] and People who think. People who [illegible] trademarks [illegible]

DSL modems on tap from Ascend and Alcatel

Digital subscriber line devices can reach multiple locations over a single line.

BY TIM GREENE

Ascend Communications and Alcatel are offering digital subscriber line (DSL) devices that let users contact multiple locations simultaneously.

The boxes, Ascend's CellPipe 50A DSL router and Alcatel's Speed Touch Office router, allow users to set up multiple data channels over a single DSL connection. Each channel is able to connect to a different site, such as the Internet or a corporate network supporting maximum download speeds of 8M bit/sec.

Ascend plans to announce its router later this month, and Alcatel announced its device last week at the CeBIT conference in Hannover, Germany.

Both devices support an analog voice channel on the same regular phone line that carries the DSL connection. Ascend says it plans to convert that single analog channel to two digital ISDN channels with an upgrade option it will offer later this year.

Ascend also plans to add more voice channels using bandwidth borrowed from the DSL data stream, but the company has no target date for rolling out that feature.

The CellPipe 50A is available for about $1,000.

While supporting downloads up to 8M bit/sec, the Ascend and Alcatel routers require a separate device to split the voice channels from the DSL stream. But both devices can also be configured to support a slower form of DSL, known as DSL-Lite, that tops out at 1.5M bit/sec and requires no separate voice splitter.

The Ascend and Alcatel boxes are designed to interoperate with Alcatel-made gear at the carrier end of the DSL connection. That means DSL customers of certain regional Bell operating companies that have agreed to use Alcatel carrier DSL gear will have a choice of modems to buy for their end of the circuit. Ameritech, SBC and BellSouth have agreements to buy the Alcatel hardware.

While both Ascend's 50A DSL and Alcatel's Speed Touch Office devices comply with DSL standards, the standards are relatively new. It generally takes some testing and adjustments to get one company's implementation of a standard to work with another company's.

Ascend uses DSL chips made by Alcatel, which guarantees basic compatibility with Alcatel carrier DSL gear.

The DSL products work by converting Ethernet traffic from a PC into PPP and then wrapping that PPP traffic up inside ATM cells. ATM is the protocol that actually crosses the DSL wire.

ATM technology lets users set up multiple separate permanent virtual circuits (PVC) across the DSL connection. Each PVC can be used to carry traffic to a separate destination. Other DSL configurations allow traffic to go only to one location.

Ascend's CellPipe 50A can be managed by Ascend's Navis software, which lets service providers monitor customers' DSL lines and provision services.

For example, a technician from a management station within the carrier network, using Navis, could increase the bandwidth on a DSL line. No technician would have to visit the customer site.

More from Alcatel

In addition to the Speed Touch Office router, Alcatel is introducing three other DSL customer devices: Speed Touch Home, Speed Touch PC and Speed Touch USB.

Speed Touch Home is a standalone modem that can be hubbed with up to eight PCs. Speed Touch PC is a PC modem card, and Speed Touch USB is an external modem that connects via a PC's universal serial bus.

Prices for the Speed Touch gear range from $200 to $700. Speed Touch Office, PC and USB are available now. Speed Touch Home will be available in June.

Ascend: (510) 769-6001; Alcatel: (800)252-2835

More
Online

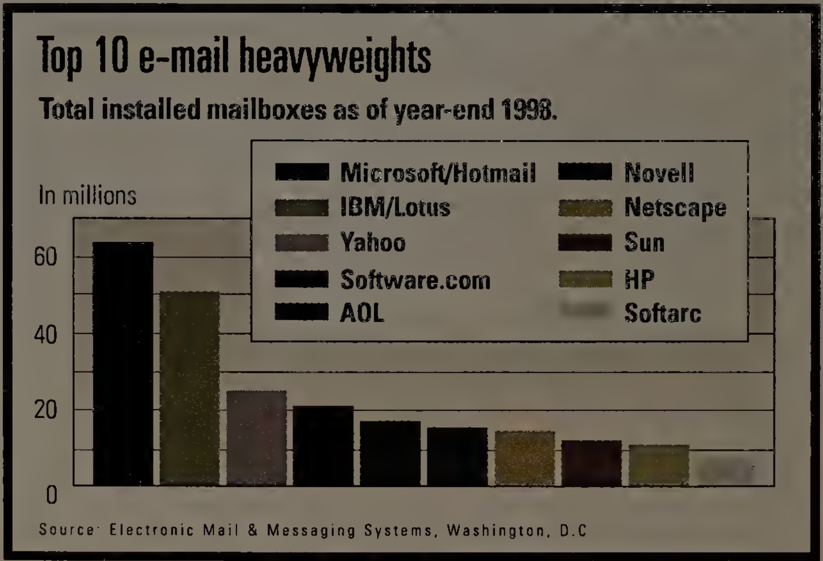
- **DSL primers and white papers.**
- **A look at DSL gear from Ascend and Alcatel.**

DocFinder
FIND IT ➤ 2137 ON FUSION
www.nwfusion.com

Software.com tally speaks volumes

BY PAUL MCNAMARA

Lotus Notes and Microsoft Exchange may get the headlines, but lesser-known Software.com claims *its* total of 37 million mailbox licenses tops them both.



Top 10 e-mail heavyweights

Total installed mailboxes as of year-end 1998.

Source: Electronic Mail & Messaging Systems, Washington, D.C

Yes, the comparison is apples to oranges because Lotus and Microsoft sell primarily to large corporations, while Software.com pitches its InterMail messaging servers to service providers. However, that's an enormous number of server access licenses by any measure. And, as the accompanying graphic indicates, Software.com has clearly muscled its way into the upper echelons of messaging vendors.

"It's wrong to compare Hotmail to Exchange or Software.com's InterMail to Lotus Notes; however, a mailbox is a mailbox," says Eric Arnum, editor of the *Electronic Mail and Messaging Systems* newsletter. "Software.com has 37 million licenses out there and [at last count] 28 million of them are installed, so this is a significant vendor."

Software.com sells InterMail servers and the client licenses to access them to the likes of AT&T Worldnet, GTE.net and Bellsouth.net, which in turn offer consumers and companies a range of hosted Web mail and business-class e-mail services, including integration with voice mail, fax and pagers. The company does not sell client software, so customers access the servers using Web-based e-mail clients or Internet standard-based clients.

"We like the product, and we get reasonably good support," says Jon Crumrine, product manager for application services at Intermedia Business Internet, a network services provider in Beltsville, Md. "It's doing well principally because it is the leader in its market, and there's not a lot of competition."

According to Crumrine, Software.com may need to guard against growing pains, however.

"I wish it was a little bit more responsive in that information requests sometimes take a little bit of time, too," he says.

Software.com was founded in 1993 and merged with Accordance Corp. in 1996, with dual headquarters having been maintained since in Santa Barbara, Calif., and Lexington, Mass.

"The No. 1 reason for our growth is that service providers are moving off Unix sendmail, the freeware/shareware technology that most of them used to get started," says Valdur Koha, company president. "They are basically looking for a robust, commercial-strength, carrier-scale messaging product."

The ability to scale to tens of thousands and hundreds of thousands of users has always been Software.com's calling card. That card will continue to open doors as more ISPs, telcos and portal sites offer ever-more-sophisticated and voluminous e-mail services, Koha says.

"We're talking to customers who are not only thinking about, but planning for, tens of millions of users," Koha says.

Accelerated demand for Web and ISP mail services has accounted for much of the company's recent success, Koha says. However, he also sees 1999 being the year that outsourced corporate e-mail finally delivers on its much-hyped promises, which will mean even more business for Software.com.

"Since last fall, many if not all of our [service provider] customers have committed to a significant number of mailbox licenses on the business side," Koha says. This means they have corporate clients waiting in the wings.

In addition to the service provider do-it-yourselfers that build their own messaging systems based on sendmail, Software.com faces competition primarily from Sun and Netscape.

"All three of the companies seem to be doing very well in that market, but Software.com is doing best," Arnum says. ◪

ADC KENTROX Frame Relay SLA Monitoring.

Because guesswork isn't in your job description.

***SPECIAL OFFER*—FrameVision Starter Kit**
www.kentrox.com/starterkit

You have to pinpoint and evaluate problems with your Frame Relay network.

That's a tough job when you have absolutely no information to work with. But now, Frame Relay SLA monitoring from ADC Kentrox takes the guesswork out of managing your network. And with the FrameVision™ Starter Kit, you can take your first look at what's really going on with your WAN traffic—*risk-free!*

Order the FrameVision Starter Kit by July 31, 1999, and you can start to monitor your Frame Relay SLA. Try this special offer, priced at $2,295 —and save an additional $150 if you order by May 31, 1999.

For more information call 1-800-733-5511 or visit www.kentrox.com/starterkit. Or call your ADC Kentrox reseller today to place an order (Model #72601).

It's the risk-free way to see what you need to make smart network decisions.

ADC Kentrox®
Redefining Network Access™

Free Product info enter NWInfoXpress #73 online @ **www.networkworld.com/infoxpress**

Oblix opens NDS to end users

BY CHRISTINE BURNS

SALT LAKE CITY — Start-up Oblix, Inc. this week will announce a version of its directory content-management software that will help customers populate and update information stored in Novell Directory Services (NDS).

Oblix, of Mountain View, Calif., has revised its existing product — now called Corporate Services Automation (CSA) Solution 3.5 — to allow end users to tap into the NDS data store and update their personal information.

The software sits on top of a Web server and provides access to the directory back end using Lightweight Directory Access Protocol.

CSA Solution 3.5 lets an administrator dictate which fields individuals are allowed to change and when they can make alterations so network security is not compromised. End users make the changes using a Web browser.

According to Oblix, the new release is one-third faster than the old version, has better links with Enterprise Resource Planning applications, and includes new searching and reporting utilities. It will ship at the end of this month.

Oblix plans to make its new NDS support available when NDS Version 8 ships next month.

Pricing is $50 per user.

Novell CEO Eric Schmidt will show off the Oblix tool at the BrainShare user conference, where he will demonstrate a new, highly scalable version of NDS that can hold up to 500 million directory objects inside a single directory server (*NW*, March 8, page 10).

PROFILE: OBLIX

Headquarters:	Mountain View, Calif.
CEO:	Sandeep Johri
Founded:	June 1996
Product:	Corporate Services Automation (CSA) Solution, a suite of LDAP-based directory content- management tools
Fun fact:	During the four-hour companywide internal test of its latest product, Oblix management offered a shot of tequila for every bug found.

oblix

"That's a lot of information for IS folks to have to input, track and keep updated," says Robert Drescher, Oblix vice president of marketing. "We let the end users, who know firsthand when they have to change that information, be in charge of it."

NDS Version 8 is the only version of NDS that Oblix will support.

Users of the original Oblix software, which supports Netscape's Directory Server, are saving time and money.

The New Jersey Department of Human Services is using the Oblix software to manage information about its 60,000 employees and independent contractors.

Don Johnson, director of network operations, says it would have been easy to build hooks into the department's human-resources data-bases to get up-to-date information about employees.

"But in order to pull off having all the independent contractor information stored in the same directory, we had to give them direct access to the directory," Johnson says.

Oblix: (650) 526-7800

BUILD IT. CONNECT IT. MANAGE IT.

STACK IT.

ISO 9001 REGISTERED

with LANCAST CenturyStack™ 8100 Hubs

Looking for flexible connectivity that's affordable?

Then STACK IT with LANCAST CenturyStack 8100 Series Hubs. Not only do you get the performance LANCAST products are famous for, you get the perfect plug-and-play solution for your Ethernet and Fast Ethernet LANs. It's also perfectly scalable. You can stack up to four unmanaged CenturyStack hubs for a maximum of 64 ports and up to six managed CenturyStack hubs for a total of 144 ports. And all ports are 10/100 Mbps auto-sensing. An internal switch module allows 10 and 100 Mbps domains to communicate and only one module is required per stack. Plus the CenturyStack Managed hubs are managable via a web-browser, SNMP, Telnet and local management. To learn more about our products visit www.lancast.com or call 1-877-LANCAST.

Stackable high performance dual-speed connectivity for workgroups and small office LANs

LANCAST®

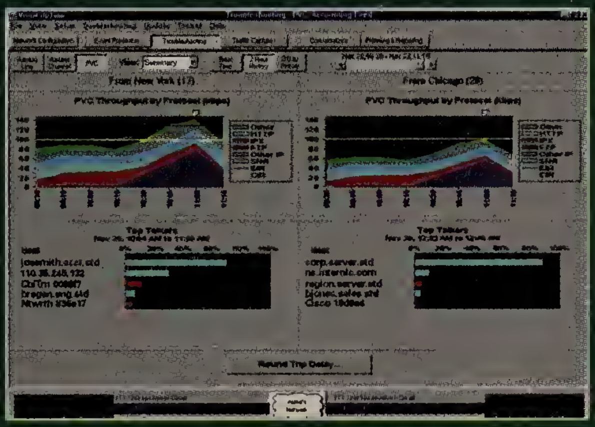
12 Murphy Drive, Nashua, NH 03062
www.lancast.com

LANCAST and the LANCAST logo are registered trademarks and CenturyStack is a trademark of LANCAST, Inc.

Free Product info enter NWInfoXpress #58 online @ **www.networkworld.com/infoxpress**

How can you reduce the cost of WAN downtime?

Make it Visual.



VISUAL NETWORKS®

THE WAN SERVICE LEVEL MANAGEMENT LEADER.

Free Infonetics White Paper "Cost of WAN Downtime" • www.visualnetworks.com/nw

© 1999 Visual Networks, Inc. Visual Networks is a registered trademark of Visual Networks.

Free Product info enter NWInfoXpress #67 online @ www.networkworld.com/Infoxpress

Hacker arsenals feature new weapons

New and improved destructive tools require even greater network administrator vigilance.

BY ELLEN MESSMER

ORLANDO — It's never been a better time to be a hacker — or a worse time to be defending your network against intrusion and destruction.

The latest round of hacker tools for cracking passwords, and sniffing out or even remotely hijacking your network is more deadly than ever, according to security experts trying to keep tabs on the hacker front.

Take a new tool called Hunt, for example. Purportedly written by a hacker named Cra, this Unix tool lets an attacker automatically sniff a File Transfer Protocol, rlogin or telnet connection and take over a user's machine.

HACKER ALERT

"This is session hijacking," says Edward Skoudis, technical director at Reston, Va.-based consultancy Global Integrity Corp. Skoudis spoke on the subject at last week's Infosec conference here, and says Hunt outdoes anything he has seen in terms of its effectiveness to monitor and take command.

In addition to Hunt, the hacker arsenal has been stocked in the past few months with impressive upgrades on older standbys, such as L0phtCrack for password cracking and NetBus for remote spying and network control.

The new L0phtCrack 2.5 cracks NT passwords 450 times faster than before and now comes with a sniffer to help capture them, Skoudis says.

For remote spying, NetBus 2.0, out since January, is no longer free but will cost the would-be hacker $15.

Another new tool, Nmap, takes port scanning to new heights — it's not only very effective but it is also much harder to detect than other tools, such as Strobe or Probe.

Skoudis suggests protective maneuvers, such as encrypting network sessions and shutting down used ports. But the reality is that networks are more vulnerable than ever before.

But at Infosec, attended by hundreds of IS professionals representing industry and government, it looked like the good guys aren't giving up the fight.

Charles Schwab & Co., which now handles two-thirds of its trades via its Web site, had plenty of staff attending Infosec. Ed Ehrgott, Charles Schwab's electronic brokerage IS director, puts network snooping at the top of his list of online business dangers.

"The new tools don't only let [intruders] identify what ports are open. They also let them know what operating system is running," Ehrgott points out. "Without a secure operating system, all security bets are off."

To that end, Charles Schwab spends enormous resources testing every electronic commerce-based application line by line to make sure hackers can't break into its Web server through buffer overflows. Buffer overflows take advantage of programming errors in elements such as Common Gateway Interface scripts. By exploiting these errors, hackers can enter information over the Web that gets dumped into the operating system and gives the hacker some measure of control.

Ehrgott emphasizes that organizations have to diligently install every software patch on their machines the minute a new vulnerability is discovered by CERT or other security information resources.

Some hackers use good tools, such as sniffers, to do bad things. Network managers have long relied on commercial analyzer products, such as those from Network Associates, En Garde, AG Group, Hewlett-Packard and Memco. These products help design and troubleshoot networks and are growing more sophisticated in network intrusion detection.

But Mark Kean, systems security manager at the Des Moines, Iowa-based Multi-State Lottery Association, worries that the free demonstrations that vendors post on Web sites are falling into hackers' hands.

"Some of these products can be used against you," he says. ◪

The latest hacker tools: meaner than ever

- **Hunt** — A tool that automatically sniffs a telnet, rlogin or FTP connection and lets attacker take it over.
- **NetBus 2.0** — A tool for spying and taking network control.
- **Nmap** — A tool with advanced scanning capabilities. It can perform "half-open" scans to elude detection.
- **QueSo** — An advanced tool for TCP stack fingerprinting of NT, Unix, Macintosh and Cisco IOS.
- **Sneakin** — When placed on an internal host, it lets an outside attacker "reverse" the victim's outbound telnet connection.
- **Loki** — It gives an attacker the ability to tunnel shell sessions over ICMP or UDP protocols to take over a victim's machine.
- **L0phtCrack 2.5** — It cracks NT passwords 450 times faster; now includes a sniffer.
- **Rumored to be out soon: Back Orifice 2.0** — perhaps for NT server.

SOURCE: GLOBAL INTEGRITY CORP., RESTON, VA

Hey readers! *Network World* is proud to offer you something money can't buy — a chance to grace the cover of our first-annual You Issue, arriving on your desktop this July.

Part of our bimonthly Signature Series, the You Issue will be devoted to covering you, the *Network World* reader — your jobs and your hobbies, your gripes and your delights.

Here's all you have to do to win a spot on our cover: Be the *Network World* reader who works in the most unusual spot in the world, has the coolest hobby or dedicates time to the worthiest cause.

If you think you or one of your peers qualifies, please fill out our survey, available by typing in DocFinder 1837 on our Fusion Web site (www.nwfusion.com), or e-mail your qualifications to Julie Bort, Signature Series senior editor, at jbort@nww.com. Entries are due by April 12, but don't delay — remember, this is your chance for maximum exposure.

NetworkWorld

Editor in Chief: John Gallant
Editor: John Dix

NEWS
News Editor: Doug Barney
News Director: Bob Brown
Associate News Editor: Michael Cooney
(508) 875-6400

NETWORK WORLD FUSION
Online Editor: Adam Gaffin, (508) 820-7433
Senior Online Reporter: Sandra Gittlen, (508) 820-7431
Staff Writer: Jason Meserve, (508) 820-7567
Online Copy Editor: Sheryl Hodge (508) 820-7532

INFRASTRUCTURE
Senior Editor: Christine Burns, (508) 820-7456
Senior Editor: John Cox, (978) 834-0554, Fax: (978) 834-0558
Senior Editor: Jeff Caruso, (650) 358-4515, Fax (650) 358-4518
Senior Editor: Deni Connor, (512) 345-3850, Fax: (512) 345-3860
Senior Editor: Jim Duffy, (508) 820-7525
Senior Writer: Marc Songini, (508) 820-7484

CARRIERS & ISPs
Senior Editor: David Rohde (202) 879-6758; Fax: (202) 347-2365
Senior Editor: Tim Greene, (508) 820-7422
Senior Editor: Denise Pappalardo (202) 879-6745; Fax: (202) 347-2365

ENTERPRISE APPLICATIONS
Senior Editor: Robin Schreier Hohman, (203) 459-9948
Senior Editor: Ellen Messmer, (202) 879-6752, Fax: (202) 347-2365
Senior Editor: Paul McNamara, (508) 820-7471

COPY DESK/LAYOUT
Managing Editor: Charley Spektor
Copy Chief: Melissa Shaw
Copy Editors: Lisa Kaplan Adase, John Dooley, Denise Dubie, Melissa Reyen
News Layout Editor: Lisa Kaplan Adase

ART
Design Director: Rob Stave
Associate Art Director: Tom Norton
Deputy Art Director: Allyson Nickowitz
Assistant Art Director: Paul M. Lee
Graphic Designer: Lisa Hovsepian
Online Designer: John Fischer
Infographics Researcher: Phil Hochmuth

FEATURES
Features Editor: Paul Desmond, (508) 820-7419, Fax: (508) 820-1103
Managing Editor, Features: Amy Schurr, (508) 820-7485, Fax: (508) 820-1103
Features Reporter: Neal Weinberg, (508) 820-7449, Fax: (508) 820-1103
Associate Features Editor: Susan Collins, (508) 820-7413, Fax: (508) 820-1103
Associate Features Editor: Suzanne Gaspar, (508) 820-7489, Fax: (508) 820-1103

REVIEWS
Test Center Director: Lee Schlesinger (508) 820-7416
Reviews Editor: Ann Sullivan (508) 820-7408

Test Alliance Partners: Mark Gibbs, Gibbs & Co., Joel Snyder, Opus One, Dennis Williams, ProductReviews.com; John Bass, Centennial Networking Labs; Steve Bell, Silicon Valley Networking Laboratory; Bob Currier, Duke University
Contributing Editors: Daniel Briere, Mark Gibbs, James Kobielus, Mark Miller

SIGNATURE SERIES
Executive Editor: Beth Schultz, (773) 283-0213, Fax: (773) 283-0214
Senior Editor: Julie Bort (970) 468-2864, Fax: (970) 468-2348
Art Director: Tom Norton
Deputy Art Director: Allyson Nickowitz
Senior Copy Editors: Melissa Reyen, Denise Dubie

Editorial Operations Manager: Cheryl Crivello
Office Manager, Editorial: Glenna Fasold
Editorial Assistant: Pat Josefek
Research Assistant: Deidra Messenberg

Introducing The BlackDiamond™ Chassis.

Layer 3 switching has evolved to BlackDiamond. It's the keystone of Extreme's enterprise LAN system, which delivers unprecedented simplicity from the desktop to the core. Using the same hardware, software and management architecture common to all Extreme switches, BlackDiamond is the only chassis to combine Wire-Speed IP Routing and end-to-end QoS into one highly evolved system. It's fast at 48 million packets per second throughput. It's big on density to support over 200 desktop connections plus gigabit links for servers and backbones. And it's fault-tolerant for mission-critical applications. BlackDiamond from Extreme Networks. Anything else is practically prehistoric.

extreme networks

www.extremenetworks.com
800-822-3206 (U.S.)
+1 818-865-2811 (Outside U.S.)

© 1998 Extreme Networks. BlackDiamond is a trademark of Extreme Networks. Names identified by ™ or ® are trademarks or registered trademarks of their respective manufacturers. Specifications subject to change without notice.

Free Product info enter NWInfoXpress #69 online @ **www.networkworld.com/infoxpress**

Broadjump leaps into broadband management

Making customer management easier buys ISP loyalty.

BY DENI CONNOR

Broadband connections to the home or remote locations sound great in theory. After all, who wouldn't want an inexpensive high-speed tie to the Internet or a corporate network using today's copper or cable lines?

The trouble is, digital subscriber line (DSL) and cable modem connections can be difficult to install and maintain.

No wonder they are only available in a mere sliver of all possible locations.

Broadjump aims to change all that. The start-up is building software that makes it easy for customers to install DSL or cable connections themselves.

The unnamed software also will let service providers solve problems remotely and update software over the same lines.

If adopted by ISPs and carriers, the software could put an end to visits by cable, xDSL and even wireless technicians.

Instead, users could simply wait for a cable, xDSL or wireless modem — along with an installation CD — to arrive by mail.

The CD will guide the customer through the installation of the modem and Ethernet adapter.

It will also handle PC and network configuration and the installation of the Ethernet driver.

ED LALLO

Broadjump executives Adam Chibib, Kip McClanahan, Kenny Van Zant and James Crow (L to R) are jumping at the DSL mgmt. market.

When connection problems occur, Broadband software will kick in, helping the customer troubleshoot his connection.

If the problem cannot be resolved with the troubleshooting software, the customer will be prompted to call the service provider, which takes over the problem-finding process, saving the hundred irksome and lengthy questions normally asked by technical support.

Broadjump's software will run on Unix, Linux and Windows NT Web servers at ISP locations and customer workstations running Unix, Linux, Windows 9x/NT or MacOS. Product release date and shipping information was unavailable from the company.

But will the product catch on? Citing security issues, some analysts say users may be reluctant to let service providers peek at their sites.

But Joe Tier, director of enterprise solutions engineering for national ISP Digex disagrees.

"Users are developing trusted relationships with the Internet and their ISPs," Tier says.

Where it all began

The founders of Broadjump, led by Kip McClanahan, president and CEO, have known each other since they attended Westwood High School in the suburbs of Austin, Texas. Their relationships deepened when they worked as engineers at Cisco.

Wanting to pursue the development of a management package that Cisco was not interested in, they left and started Broadjump in November 1998.

Cisco has management software for its equipment but is not interested in managing the network desktop connection. Cisco, however, remains a close partner, Broadjump officials say.

Broadjump's 12 employees are crammed into a 1,500-square foot office, but in April will move to roomier 15,000 square foot digs.

The company has already rounded up $5 million in venture capital from Austin Ventures, Techxas Ventures and private investors, such as John McHale, founder of ADSL pioneer NetSpeed, which Cisco bought in April 1998. ◪

PROFILE: BROADJUMP

START-UP SPOTLIGHT

Headquarters:	Austin, Texas
Founded:	November 1998
Product:	Management software for broadband provisioning
Funded:	$5 million from Austin Ventures and Techxas Ventures
Management team:	Kip McClanahan, president and CEO; Kenny Van Zant, vice president sales and marketing; James Crow, director of engineering; Adam Chibib, director of finance and operations
Founders backgrounds:	Cisco, Tivoli
Fun fact:	The company name was generated by a software program.

Global Crossings trades load of stock for Frontier

BY DENISE PAPPALARDO AND TIM GREENE

Merger mania in the telecom world continued last week when Global Crossings, Ltd., a start-up network service provider, acquired Frontier Corp. for $11.2 billion in stock.

Frontier, formerly Rochester Telephone, is the nation's fifth-largest long-distance company, with more than two million customers. The company had healthy revenue of $2.6 billion for 1998, and, more importantly, Frontier has an established customer base — which is what attracted Global Crossings, analysts say.

Global Crossings is building an international fiber-optic network that will connect the U.S. with South America, Europe and Asia. Global Crossings is a carrier's carrier, selling wholesale access to its available network to other service providers. The company had revenue of $424.1 million in 1998.

Why Frontier?

Frontier offers local, long-distance, cellular, paging, Internet access and Web hosting services through its Frontier GlobalCenter division. The company has absorbed 34 local phone companies and this year is building a 15,000 mile, OC-192 speed fiber-optic network that will connect 120 cities. The firm is buying some of its fiber from Qwest, the carrier that is building a nationwide fiber network along railroad beds.

"This acquisition gives Global Crossing a reach into the U.S. market. Frontier has U.S. presence, and that's the key here," says Frank Dzubeck, president of Communications Network Architects, a consultancy in Washington, D.C.

Although some analysts are comparing this deal to WorldCom's acquisition of MCI or AT&T's deal with British Telecommunications, it's not even close, says Melanie Posey, senior analyst at International Data Corp., in Framingham, Mass.

"It's more like Qwest's acquisition of LCI," Posey says. Qwest bought long-distance carrier LCI International one year ago. "Global Crossings has no market share, no experience, no customer base and no back office systems, but Frontier does," she says. When Qwest bought LCI, the companies were very much in the same positions. ◪

■ ***"This acquisition gives Global Crossing a reach into the U.S. market. Frontier has U.S. presence, and that's the key here."***

Frank Dzubeck, president, Communications Network Architects

Be a
Net Know-It-All
For the answer to this week's question and more net trivia, visit Network World Fusion and enter 2349 in the DocFinder box.

This week's question:

What's the name of Siemens' new U.S. data network company?

Apple takes a weak stab at open source

BY JOHN COX

CUPERTINO, CALIF. — Apple ripped some pages from the Linux open source book but ignored one of the most important chapters.

The firm last week began shipping its new server operating system, Mac OS 10 Server, selling for $500. Apple also announced a free, public version of the product, called Darwin. But whereas all Linux source code is open, Darwin lacks some key parts of Mac OS 10 Server, especially those built by Apple from scratch. Those remain Apple property.

The operating system is the first Apple server designed for Macintosh clients.

COURTESY OF APPLE COMPUTER, INC.

Jobs puts operating system on the Web.

Apple hopes developers will continually improve the operating system, as developers do with Linux. But the firm has released only part of the OS 10 Server software, including the microkernel, which is the server's heart; the BSD 4.4 Unix operating environment, which provides an array of services; and the integrated Apache Web Server. Most of this software, however, is already free on the World Wide Web. Darwin includes significant Apple code but not the Macintosh graphical user interface, or other parts of the firm's intellectual property, says Ken Bereskin, Apple's director of operating system technology.

One analyst says Mac OS 10 Server indicates a major change in approach for Apple.

"I think Steve Jobs in the past has been the high priest of proprietary [products], and this is a good step for Apple," says Chris Le Tocq, director of software consulting with Gartner Group in Boston.

Others are unconvinced. "It's a good public relations move, but I don't think they've open-sourced much of the software that differentiates Apple's Unix-based operating system from other Unix-based offerings," says Eric Bennett, systems administrator at Cornell University's biochemistry research lab in Ithaca, N.Y.

"It's an attempt, but a poor one, at making the operating system more accessible to the people who can use it," says William Frisbee, a product development and support official with WebEngine in Burlington, Mass. "The funny thing is, all the pieces of Mac OS Server that are open source have been available for years on the 'Net."

Some predict the Mac server will have a strong appeal in markets where Macintoshes are deployed with AppleShare servers, and where Windows NT is not established.

Apple says it will offer Mac OS 10 Server preconfigured on a Macintosh Server G3 for $4,999. The system includes a 400-MHz processor with 1M byte of Level 2 cache memory, two 9G-byte Ultra 2 SCSI hard drives, a CD-ROM and a four-port 10/100 Ethernet controller.

James Niccolai, a correspondent with IDG News Service's San Francisco bureau, contributed to this story.

SOMEDAY, YOU'LL BE ABLE TO NETWORK JUST ABOUT ANY DEVICE YOU CAN THINK OF. IS TOMORROW MORNING GOOD FOR YOU?

Universal Thin Servers™ Actually, why wait even another minute? Our Universal Thin Servers let you connect virtually any device to the network — without a costly PC. In fact, Lantronix has network-enabled everything from blood analyzers and traffic signals to security cameras and factory automation equipment. And with over 1.5 million units shipped, Lantronix has proven time and time again that we can network practically anything.

10 year anniversary LANTRONIX

Learn more about our Universal Thin Servers today. Just call 1-800-422-7055, or visit our website for our latest white paper — because as you know, there's no time like the present.

www.lantronix.com

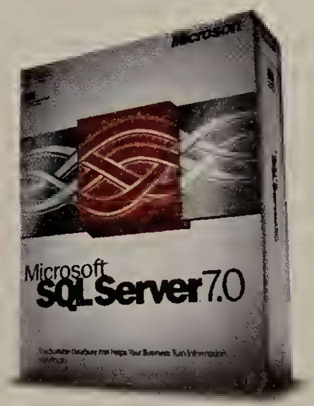
Free Product info enter NWInfoXpress #74 online @ **www.networkworld.com/infoxpress**

As with every new piece of enterprise technology, someone has to try it first.

Microsoft
Where do you want to go today?®

The good news is, it won't be you.

Introducing Microsoft® SQL Server™ 7.0, tested and proven in companies like Pennzoil and HarperCollins.* With an impending merger on its hands, Pennzoil faced a rapid increase in its user base for SAP™ R/3.™ In order to handle this mission-critical load, Pennzoil turned to SQL Server 7.0. Then there's HarperCollins. The publishing leader uses the SQL Server 7.0 data warehousing platform to process hundreds of gigabytes of data in order to make smarter and faster business decisions. To see who else is deploying Microsoft SQL Server 7.0 in their enterprise go to www.microsoft.com/sql/



© 1998 Microsoft Corporation. All rights reserved. Microsoft and Where do you want to go today? are registered trademarks of Microsoft Corporation in the United States and/or other countries. Other product and company names mentioned herein may be the trademarks of their respective owners. *Initially deployed on beta code.

MasterCard, Visa trade strong security for ease of use

BY ELLEN MESSMER

When MasterCard and Visa unveiled technology for secure Internet electronic commerce transactions two years ago, they thought it would take over the world.

But while Secure Electronic Transaction (SET) has made inroads in Europe and Asia, it has faltered badly in the U.S. Faced with technical and business obstacles to SET, MasterCard and Visa are now coming up with alternatives to SET — SET Lite and Merchant-originated SET (MOSET).

But SET Lite and MOSET critically alter the SET 1.0 architecture and soften SET's rock-hard security — all for the sake of convenience. For example, the technologies abandon the idea that each online consumer is going to have a bank-issued SET digital certificate for credit-card encryption. This certificate was to be the main means of verifying the consumer's real identity on the Internet.

SET Lite, or certless SET, eliminates the need for a credit-card holder to use a SET digital certificate to "sign" his Internet transaction. It also eliminates one of the main security advantages SET has over SSL: client authentication.

With SET Lite, the card holder uses a SET-based electronic wallet to encrypt the transaction. MOSET throws away the SET wallet, presupposing that the card holder simply encrypts his credit card by means of browser-based SSL. The Internet merchant and the acquiring bank still act in SET mode, with the merchant server and bank gateway swapping digital certificates to identify each other before processing the credit card.

In the future, however, SET merchant servers such as IBM's Payment Server or the GlobeSet POS are likely to give users two options — one for SET and another for SSL.

SET Lite and MOSET are a tacit acknowledgment that SET faces an uphill battle against the Web's current widespread encryption technology, Secure Sockets Layer (SSL). Originally developed at Netscape and now the staple encryption technology used in Web browsers and servers, SSL is effective for simple data encryption, but it's not integrated into the banking system like SET.

MasterCard says it views MOSET and SET Lite as "steppingstones" to full-fledged SET. MOSET, which may end up being called Backend SET when it's officially announced, is going to be an option for merchants, says Art Kranzley, MasterCard's senior vice president of electronic commerce.

"It's a migration path to SET," Kranzley notes, adding that the decision allows vendors to sell merchant and bank SET gear as SET-certified even if the consumer doesn't have a SET wallet and certificate.

A third idea, already being tested by banks, is the so-called server-side wallet, which puts a user's digital certificate and wallet on an Internet server.

Why has SET stalled? Sources at Citicorp say simply that SSL killed SET. But it's harder to explain than that, given that Internet merchants stand to gain real benefits from SET. When a merchant completes a SET digitally signed credit-card purchase, Visa and MasterCard levy a lower service charge because the transaction is considered less risky than accepting a card number without SET.

Visa and MasterCard regard a SET transaction over the Internet to be the same as having the card holder sign his name on a purchase in front of the merchant. SSL is more like a mail-order merchant taking a credit-card number over the phone.

As to SET Lite and MOSET, MasterCard is unlikely to give online merchants reduced service charges if the card holder isn't using a SET certificate, even if the merchant and the bank are using SET gear, Kranzley says.

One headache with SET, insiders say, is finding a way to distribute the 10M bytes of software that comprises the SET wallet. Another issue is the interoperability problem between different vendors' SET wallets, merchant servers and gateways.

In spite of the SET-compliance testing overseen by the joint MasterCard-Visa venture called SETCo, there still remain interoperability problems even with SETCo-certified gear, Kranzley acknowledges. To resolve those problems, IBM and Hewlett-Packard over a year ago started the Interoperability Testing Initiative to conduct the kind of one-on-one application testing that SETCo wasn't set up to do. ◪

SET milestones

The Secure Electronic Transaction protocol is used for processing credit-card transactions on the Internet. The following are some details on the protocol's development:

June 1995	Visa and MasterCard say they will work together to develop a common method for secured bankcard purchases on open networks such as the Internet.
June 1997	Visa and MasterCard publish SET 1.0 as an open industry protocol detailing how payment transactions on the Internet will be secured using encryption technology and digital certificates.
December 1997	Visa and MasterCard establish SETCo to manage global adoption of SET through interoperability testing of SET-based consumer wallets, merchant servers and bank gateways.

IETF,
continued from page 1

port Working Group struggled with how to send SS7 signals over IP networks, while the Media Gateway Control Working Group heard arguments for a new protocol that could let media devices, such as PBXs, interact without PSTN signaling. SS7 is a switch-to-switch protocol that lets telephone switches set up calls, manage circuits and perform intelligent network functions.

Cisco and other router vendors would have customers believe that widespread voice-over-IP service is just around the corner. But telco equipment makers, such as Nortel Networks, are quick to point out that every company has a long road to hoe to get to that point. Therefore, interim standards are needed for IP networks and the PSTN to communicate with each other.

The IETF's Signal Transport Working Group is developing a standard that will let IP switches or gateways understand SS7.

The Signal Transport Working Group is developing protocols that will let two switches that are transporting voice traffic over an IP network communicate, says Scott Bradner, transport area director for the IETF. "It's a way to replace the wires in the phone network with IP connectivity," he says. In the long run, this is the IETF's goal.

> ***"Some people would like to see SS7 go on forever. That's very unlikely."***
>
> Fred Baker, IETF chair and Cisco engineer

"Some people would like to see SS7 go on forever," says Fred Baker, IETF chair and Cisco engineer: "That's very unlikely."

The IETF's Media Gateway Control Working Group is operating under the assumption that SS7 networks will morph into pure IP. The pending media gateway control protocol defines how media devices should control packets.

The media gateway control protocol, for which two drafts were presented at the meeting, will determine how calls are manipulated and forwarded. For instance, if a company is supporting voice over its extranet, those calls would pass through a gateway that supports the media gateway control protocol.

The protocol gives the device the ability to determine if a call should be sent over the company's intranet, over the Internet or over the PSTN. The working group will define its own signaling protocol specific to IP.

Both working groups say their specifications will be ready by year-end, but multinetwork interoperability is still 18 to 24 months off, says Krishna Sai, a network software engineer at IETF member ECI Telecom in Jacksonville, Fla.

Service providers are not only depending on the IETF for voice-over-IP standards; they are looking to the International Telecommunication Union and vendor-driven forums such as iNow to address billing and voice traffic exchange specifications that promise interoperability.

PSINet, one of only a few ISPs offering a business-oriented voice-over-IP service, is looking for interoperable settlement systems so multiple carriers can handle voice traffic.

Today, PSINet only offers its customers an intranet, PBX-to-PBX voice-over-IP service: The ISP says it's the only service that can be supported with strong service guarantees. As technology and standards develop, PSINet plans to expand its PSIVoice service offerings. ◪

More Online
- IETF veterans discuss the future of IP protocols.
- A look at the lack of management tools for voice over IP.

DocFinder
FIND IT → 2136 ON FUSION

Get more info online.
DocFinder: 2136

HEWLETT®
PACKARD
Expanding Possibilities

Remove card
for instructions

Introducing the HP LaserJet 1100A. It prints 8 pages per minute, makes copies, and even scans, so users can easily share documents via e-mail. All for just $499*. It's perfect for an overworked special someone in your department. For a chance to win your own HP LaserJet 1100A, call 1-800-LASERJET Ext. 4105 or visit our website www.hp.com/go/lj1100a.

HEWLETT®
PACKARD
Expanding Possibilities

The HP LaserJet 1100A printer • copier • scanner

Speed (all functions)	8 ppm
Resolution (all functions)	600 dpi
Size (wxdxh)	14.5 x 15.8 x 14.9 in
Input Tray	125 sheets
OS Support	Windows® 3.x, 9x, NT 4.0

Networkable via HP JetDirect

Scans directly to e-mail for easy document exchange. Includes integrated desktop software for organizing scanned documents and a professional version of OCR software for editing text.

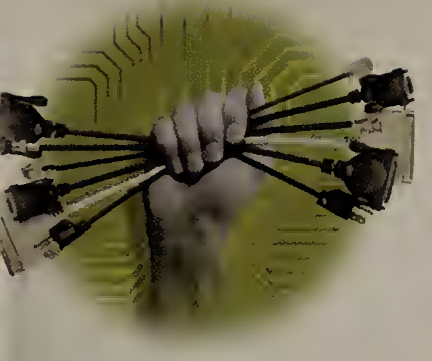
*$499**

The HP LaserJet 1100 printer

Easily upgradeable to the HP 1100A printer • copier • scanner thanks to HP JetPath technology. Simply add the copier/scanner accessory.

*$399**

©1999 Hewlett-Packard Company. *Estimated U.S. retail price. Actual price may vary. Copier/scanner accessory for HP LaserJet 1100 sold separately. Windows is a US registered trademark of Microsoft Corporation.



Infrastructure

TCP/IP, LAN/WAN Switches, Routers, Hubs, Access Devices, Clients, Servers, Operating Systems, VPNs, Networked Storage

Briefs

3Com has announced virtual private network (VPN) encryption software that lets remote workers communicate securely via the Internet or public networks. 3Com's Dynamic Access VPN client software works with the company's network interface cards and modems. It features IP Security encryption and payload compression capabilities from TimeStep and public key infrastructure technology from Entrust Technologies. 3Com expects to ship its Dynamic Access VPN encryption software in the second quarter. It will be available in two versions, supporting 56-bit Data Encryption Standard (DES) or 168-bit Triple DES encryption.

Pricing will be $65 per seat for one to nine users, $60 per seat for 10 to 99 users, $50 per seat for 100 to 499 users, and $40 per seat for 500 or more users.

3Com: (408) 326-5000

Dell says it will add remote access capabilities to its departmental and workgroup PowerEdge servers by bundling a remote access server card from Brooktrout Technology. The card has four ISDN Basic Rate Interface lines that allow users to dial up the server to gain access to corporate network resources and the Internet. The card supports up to eight concurrent incoming or outgoing connections. The card is available for PowerEdge 1300, 2300, 4300 or 4350 servers running Windows NT or Microsoft Small Business Server. Pricing for an entry-level configuration for the Dell PowerEdge 1300 workgroup server, with a 450-MHz Pentium III processor, 4G-byte hard drive, 64M bytes of RAM, 10/100M bit/sec adapter, monitor, four-port ISDN adapter and Windows NT 4.0, starts at $5,765.

Dell: (800) 388-8542

Vinca foolproofs NT failover

BY DENI CONNOR

Vinca has beefed up its Windows NT clustering software by improving support for Microsoft Exchange and SQL Server, and by adding the ability to monitor applications and protect them from failing.

Co-StandbyServer for Windows NT 4.1, in the event of failure, lets two servers act as mirrors for each other — so-called failover clustering. In the Vinca system, data is mirrored from one server to the other and vice versa in a real-time, lock-step fashion across a dedicated Ethernet, FDDI or Fibre Channel link.

Co-StandbyServer maintains state when a failure occurs, so nothing is lost in the transition to the backup server. Windows NT users may experience a pause of up to 45 seconds, but they will not have to log on to applications again. Applications will be automatically restarted.

Windows NT server clustering can be performed in three ways: data is mirrored between the disk drives of servers joined by a dedicated link; servers with a dedicated link share the same disk; or data is replicated across the network, or remotely to another server. Vinca's Co-StandbyServer and Marathon Technologies' Endurance 4000 are examples of the first method. Microsoft's Cluster Server uses the second method, and Network Integrity's LiveVault, Fulltime Software's Octopus for Windows NT and NSI Software's Double-Take are examples of products that use the last method.

Co-StandbyServer has several new features. An application monitoring tool, Service Manager, reduces downtime by monitoring and alerting a network manager when NT applications and services are failing. It allows applications to be restarted when appropriate or invokes a server switchover, if necessary.

On the Exchange and SQL Server fronts, scripts have been enhanced to allow a network manager to more easily and completely control the fail-over process. When an Exchange server fails and the other server takes over, users' Internet connections and e-mail are automatically restored. Remote and branch office connections are also supported.

"As more people start to consider mail-messaging systems to be mission-critical, failover for Windows NT becomes more important," says James Gruener, Windows NT server analyst for Aberdeen Group in Boston. An Aberdeen report shows that one in four NT networks are protected by some form of failover, Gruener says.

The Microsoft SQL Server module lets a network manager maintain and upgrade SQL databases without taking them offline. The module also provides failover capability.

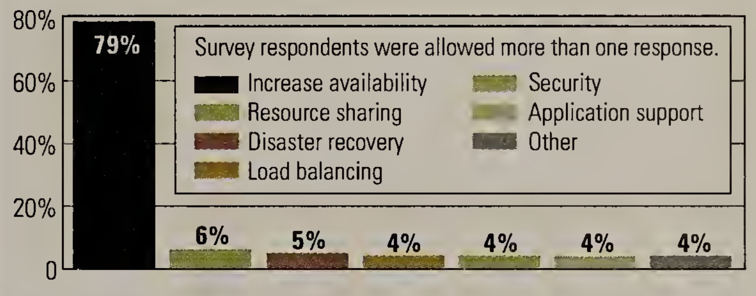
The current version of the Vinca product has received good reviews from at least one customer. "We have had Co-Standby-Server running for the better part of one year. We had two hardware failures — one network adapter and a memory bank. Co-StandbyServer picked up the failure and switched over to the other server in less than a minute. Users noticed only a slight pause," says Ben McClarin, manager of information services at Financial Pacific Insurance of Sacramento, a California supplier of commercial property insurance.

The Co-StandbyServer for NT 4.1 software will be available this month for $5,499 for a two-server configuration.

Vinca: (801) 223-3100

Clustering for availability

Most sites cluster to increase the availability of their applications, according to a survey that asked server clustering users: Why did you install clusters on your network?



SOURCE: SRC, SANTA BARBARA, CALIF.

2005: A Microsoft odyssey, the final chapter

BY CHRISTINE BURNS

WHERE DO THEY GO TOMORROW?

Third in a three-part series

This is the third in a series of three articles exploring what might lie ahead for Microsoft should the Department of Justice win its antitrust case against the software giant. So far we have considered what might happen if the judge split Microsoft into different companies or forced the company to give Windows source code away for free. In this final installment, we take a look at what could happen if Microsoft was forced to operate under the constant scrutiny of government regulators.

"Bull's-eye!" declares Bill Gates, springing up from behind his cluttered desk. He hurdles over boxes of bound government regulations to give the letter opener a firm tug, pulling it out of the makeshift dartboard on the back of the door.

"I've only managed to nail that three other times in five years," Gates squeals. His dartboard is a laminated copy of "The Five Tenants of Really Fair Trade" as authored by Judge Thomas Penfield Jackson.

Gates laments his fate as he recites the forced consent decree credo: "No bundling. No bullying. No coercion. No collusion." But he chokes on the fifth binding provision, the one with the three dart holes: "C ... Cus ... Customer choice."

Gates put up a separate building on his Redmond, Wash., campus to house the 143 government employees who traded Washington, D.C. for the Pacific Northwest. This internal software auditing team makes sure that every product Microsoft ships runs on at least three hardware platforms, supports an average of 54.3 third-party applications, has a formidable competitor already on the market

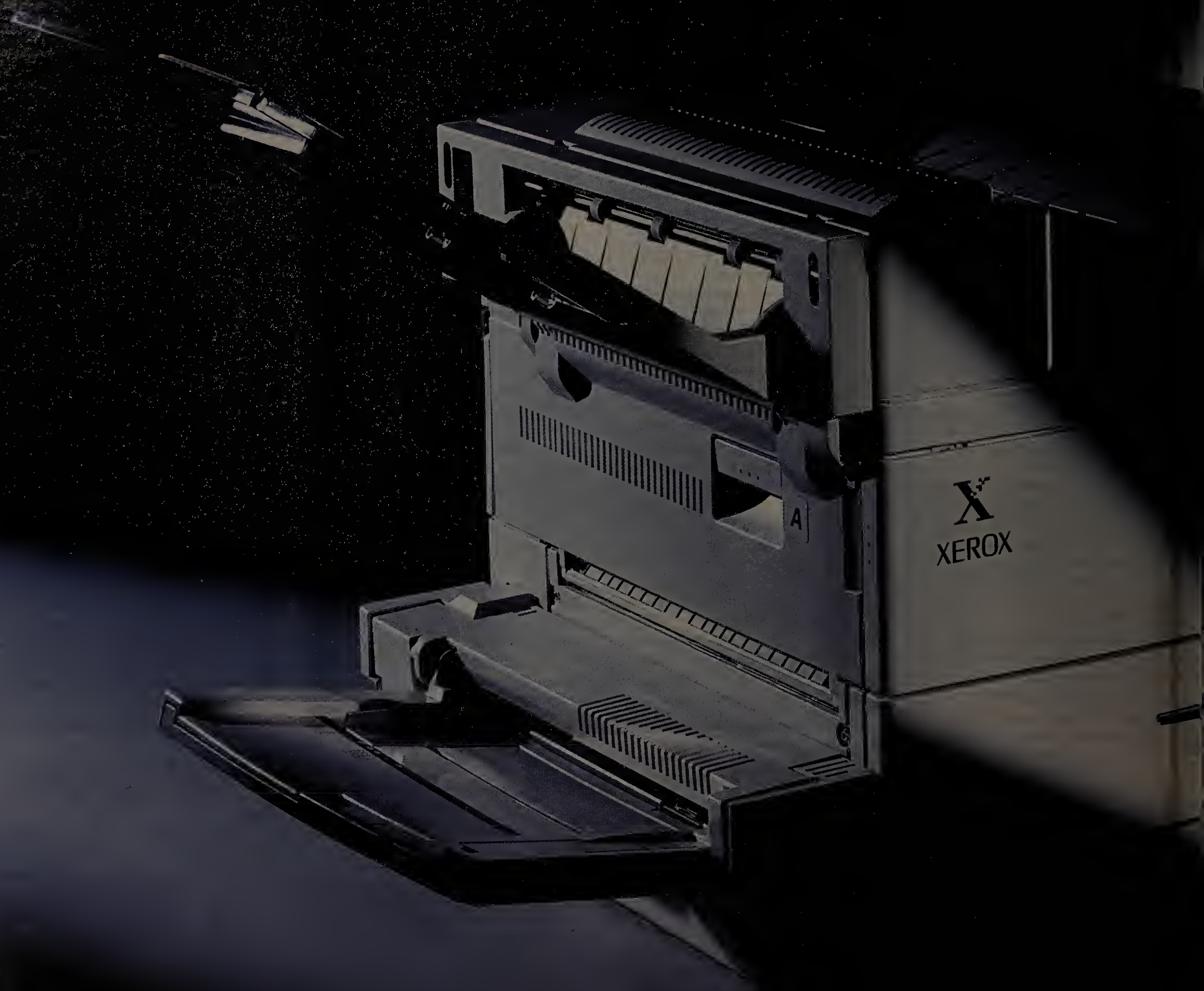
See **Microsoft**, page 22

ANCIENT DILEMMA

YOU WANT TOP PERFORMANCE.

YOU DON'T WANT TO PAY TOP DOLLAR.

IT'S CALLED BEING SMART.



1-800-34-XEROX www.xerox.com

Xerox The Document Company, the digital X, Keep the Conversation Going Share the Knowledge., WorkSet, DocuPrint and N40 are trademarks of Xerox Corporation HP and LaserJet are trademarks of the Hewlett Packard Co

XEROX SOLUTION

AT 40 PAGES PER MINUTE, THE XEROX DOCUPRINT N40 NETWORK PRINTER IS 25% FASTER THAN THE FASTEST HP LASERJET PRINTER, AT A VERY COMPETITIVE PRICE. WE CALL THAT BRILLIANT.

KEEP THE CONVERSATION GOING. SHARE THE KNOWLEDGE.

DIGITAL
THE DOCUMENT COMPANY
XEROX

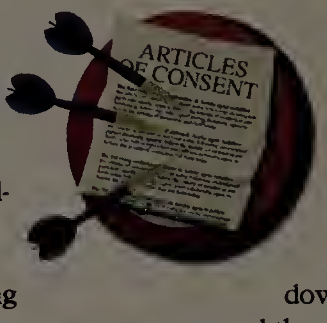
Free Product info enter NWInfoXpress #79 online @ **www.networkworld.com/infoxpress**

Microsoft,
continued from page 19

and comes in four colors.

Gates doesn't like to think about all the time and money this whole idea of customer choice costs him annually. Microsoft's development costs have more than doubled since 1999. But what sticks in his craw is that 85% of those increased costs has been spent on clerical resources — not engineering ones.

But Gates tries not to get caught up in the numbers. He's left the compliance stuff to his trusty right-hand man, Steve (Ballmer, that is).



Steve can worry about filling out the government forms in triplicate, about the bureaucratic delays in getting the products to market and about explaining basic computer geek terms to the policy wonks.

"I'm the get-around-guy," thinks Gates, as he sits down to plot his next move around the government regulations.

He openly mourns the loss of his company's nimbleness due to government interference. He fears that Microsoft is going to get so entangled in red tape that it will miss the next big turn the software industry takes. "I've got to find a way to get back in control of the flow of technology," Gates decides.

What about a shopping spree? These auditing guys just make sure there's competition when we ship a product, right? So say we slip some little start-up in Kansas a few million lines of code from one of our research and development projects. By the time we cut through the red tape and get ours ready to market, they'll have doctored up their own code for a similar product and will be selling it as our competition. We'll wait a few months. Then we'll offer them a nice price to close their doors. Next we'll move on to a start-up in Alabama to begin the process again with another product we have brewing in the labs.

Gates smiles and rubs his hands together: "I'll be the behind-the-scenes supplier of all the best ideas without any of the legal responsibilities. That's beating the government at its own game."

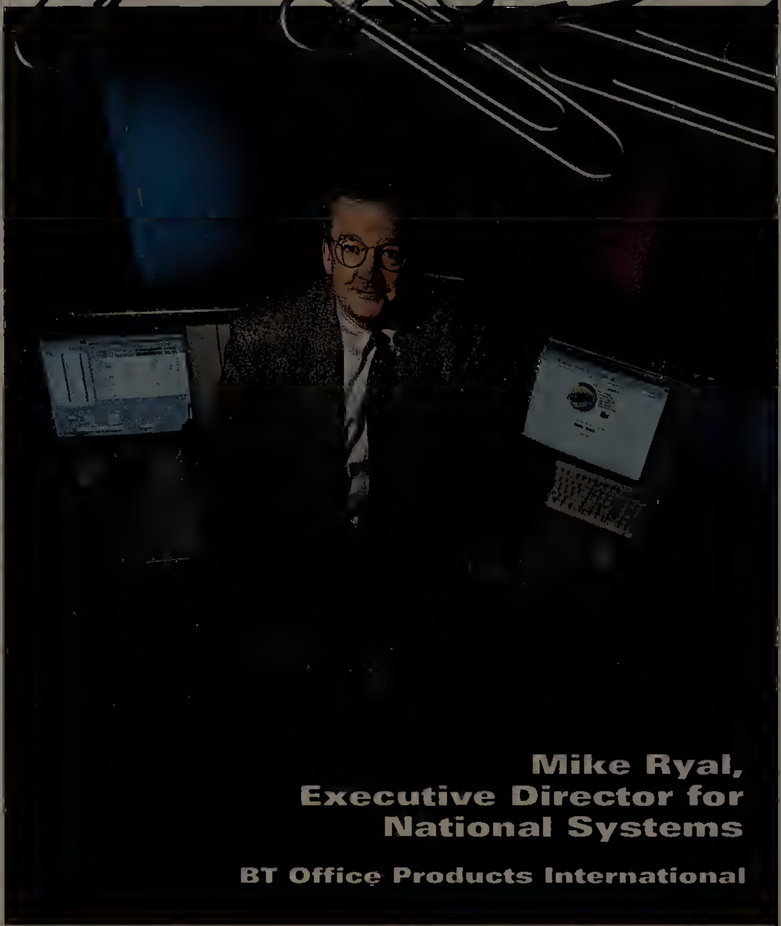
After all, what hasn't managed to kill Microsoft has only made it stronger. Gates smiles and aims his letter opener for another crack.

Editors note: A special thanks to all the industry sources who contributed ideas to this series. Thanks goes to, but is not limited to: Hillard Sterling, senior litigator at Gordon & Glickson P.C.; Daniel Kusnetzky, analyst with International Data Corp.; Tom Ferris, network engineer with a Washington, D.C.-based financial firm; Jon Oltsik, analyst with Forrester Research Group; Stephen Bacon, systems integrator with Cambridge, England, NetConnect; Travis Berkley, systems engineer with the University of Kansas; and Randall Kennedy, director of research at Competitive Systems Analysis.

More Online

- The first two parts of our series.
- The latest Microsoft antitrust news.

DocFinder
FIND IT ▸ 2127 ON FUSION
www.nwfusion.com



NetSolve manages our network so we can focus on more exciting things.

Like paper clips!

Office products may not seem thrilling to you.
But what if we told you that BT Office Products is using e-commerce to generate hundreds of thousands of dollars in sales every day?

That's a whole lot of paper clips.
And that's why Mike Ryal relies on NetSolve for remote network management and Internet security services. When you're busy building a business, you don't want your staff worrying about your network. NetSolve can take care of day-to-day monitoring and management for WANs, LANs, and security, freeing you up for business-critical tasks – like creating a new way to sell paper clips. Best of all, *we guarantee your satisfaction.* Now who's excited?

Ready to get focused?
Call 1-800-NETSOLVE or visit www.netsolve.com today.

Mike Ryal,
Executive Director for National Systems
BT Office Products International

NETSOLVE®

©1999 NetSolve Incorporated. NetSolve and the NetSolve logo are registered trademarks of NetSolve Incorporated. All other registered trademarks and service marks are the property of their respective owners.

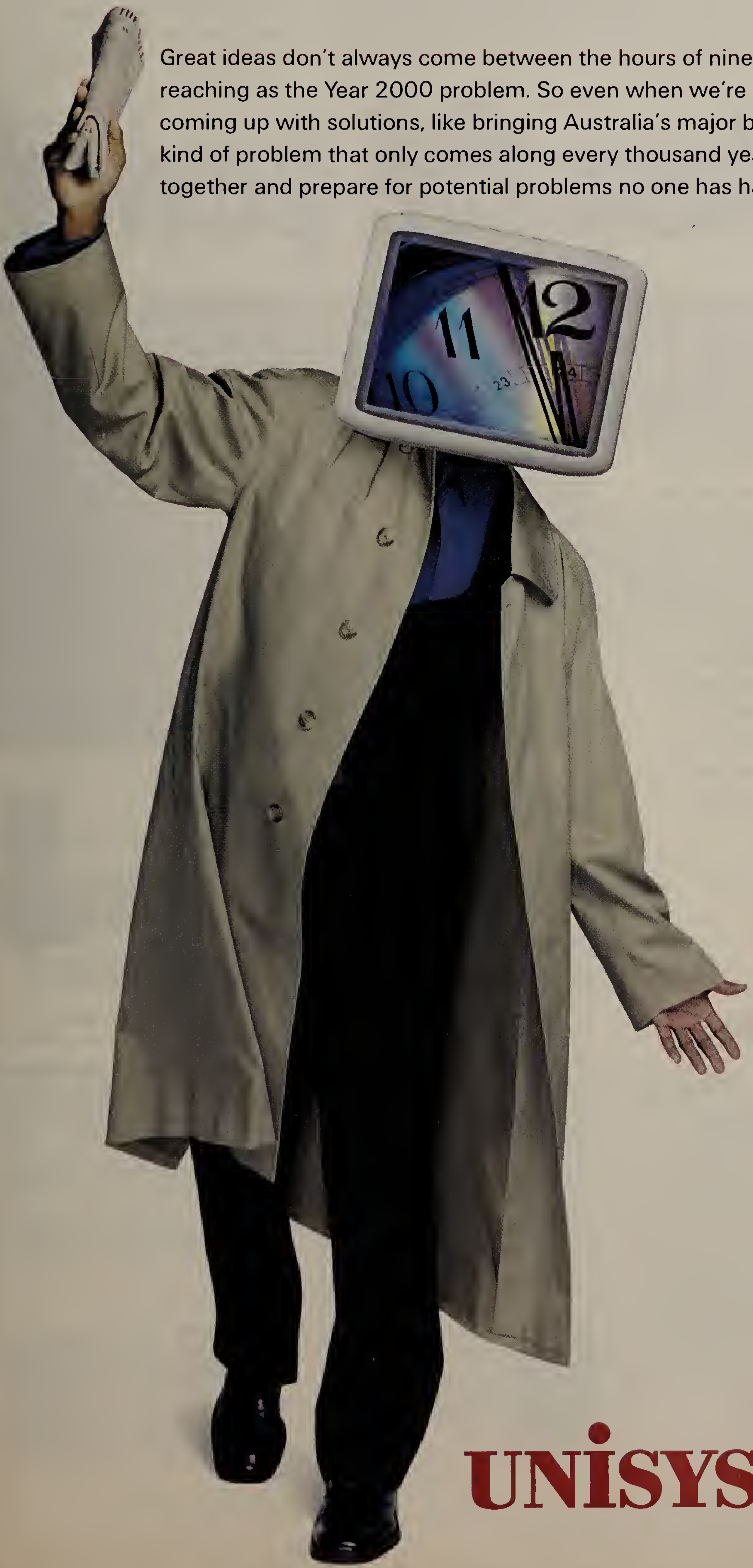
1-800-NETSOLVE **WWW.NETSOLVE.COM**

Free Product info enter NWInfoXpress #59 online @ **www.networkworld.com/infoxpress**

©1998 Unisys Corporation.

We're helping our clients with the millennium problem. Now that's really working against the clock.

Great ideas don't always come between the hours of nine to five. Especially for situations as far reaching as the Year 2000 problem. So even when we're not at work, we're working on it. And coming up with solutions, like bringing Australia's major banks together to help address the kind of problem that only comes along every thousand years. We're helping our clients work together and prepare for potential problems no one has had to face before. www.unisys.com



UNISYS We eat, sleep and drink this stuff.

Nortel switches boast apps awareness

BY JIM DUFFY

SANTA CLARA, CALIF. — Nortel Networks last week introduced two Layer 3 switches that deliver quality of service (QoS) by queuing traffic based on application.

The Accelar 8000 line consists of six- and 10-slot modular switches that can sit on a network's edge or anchor a backbone network. The switches are designed to scale up to 128 Gigabit Ethernet ports and 384 10/100M bit/sec Ethernet ports.

But the Accelar 8000's highlight is an Application Specific Integrated Circuit (ASIC) that classifies and queues traffic based on source and destination media access control and IP addresses, and at TCP and User Datagram Protocol port addresses.

Users can define network access and resource allocation policies with Nortel's Optivity Policy Manager application, and the ASIC will enforce them by shuttling traffic into one of eight priority queues at each Accelar 8000 port, says Dave Roberts, Accelar product manager at Nortel's Bay Networks division.

The Accelar 8000 can perform all of these functions at wire-speed with no detectable impact on switch performance, Nortel claims. This ability will be key in supporting applications such as SAP R/3, telephony and HTTP.

Medical supplies company Becton Dickinson is looking at the Accelar 8000 as an edge switch to handle converged network traffic, says Phil Freyer, manager of global network architecture at the Franklin Lakes, N.J., firm. "To be able to do QoS, multicast, PBX functionality and a unified type of networking — that's where we're looking at this box," he says.

A downside to the Accelar 8000 is that users will have to swap out Layer 2 interface modules if they want "full-featured" Layer 3 capabilities on each blade.

Nortel is aiming the Accelar 8000 at Cisco's recently announced Catalyst 6000 line. The 6000 comes in six- and nine-slot chassis models and is designed to scale to a total capacity of 256G bit/sec, with as many as 130 Gigabit Ethernet ports and 384 10/100s.

Initially, it was believed that the Accelar 8000 would be marketed as a Cisco Catalyst 8540 killer (*NW,* March 1, page 1). The Catalyst 8540 is Cisco's core backbone routing switch.

But Nortel's Roberts says Cisco already killed its own 8540 when it announced the 6000 line earlier this year.

"The 8540 is dead," Roberts says, referring to the performance and port density advantage the Catalyst 6000 has over the 8540. "Cisco obsoleted half of its LAN switching product line with the 6000."

Cisco disagrees. The 6000 is targeted at high-density aggregation and the distribution of wiring closet links for very large networks with the 8540 in the core, says Marthin DeBeer, director of product marketing at Cisco.

The Accelar 8000 costs $7,995 for the 10-slot chassis and $300 per Layer 2 10/100 port. Nortel did not disclose pricing for the six-slot chassis, nor for the Layer 3 ports. The switches will ship in April.

Nortel: (408) 988-2400

When the power

Introducing our newest solutions for end-to-end network availability

Storms, blown fuses, backhoes... the causes of power problems are numerous, and the results painful: data loss and damage to your expensive hardware. When power fails, APC prevails with award-winning surge suppressors, battery backup, security enclosures and management software to deliver end-to-end reliability, guaranteed. So ask your favorite reseller about APC peace of mind or visit our Web site today for an APC solution for you!

Notebook computers

solutions starting at $19.95

- Complete AC, telephone/modem surge protection for notebooks
- Multi-voltage design for use worldwide
- Lifetime product warranty

Desktop PCs

solutions starting at $99

- Surge protection and battery backup for your computer and internet connection
- Data-saving software provides warnings and safe shutdown
- User-replaceable batteries provide 3-6 years of reliable service
- "Best in Class" longest runtime guarantee (5-40 minutes)
- Complete lightning and surge protection backed by a $25,000 guarantee

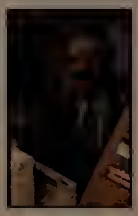
Servers

solutions starting at $325

- Intelligent Battery Management with FastCharge™ cuts recharge time by 75%
- PowerChute® *plus* software provides warnings, environmental monitoring and safe shutdown (features vary by UPS and OS)
- SNMP compatible and manageable by your Web browser
- FlexEvents™ E-mails or pages you before your users know of problems

PC MAGAZINE EDITORS' CHOICE
November 19, 1996
APC Smart-UPS 1000

Find out why APC has won over 130 awards for reliability and visit www.apcc.com *today.*



"The best equipment doesn't fail: we use APC's Back-UPS Pro®."

Brian Welsh, Manager,
In-store Systems, Help Desk,
A&P Grocers

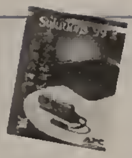
"Because power failure is not acceptable, APC Smart-UPS® are our standard."

Peul Thacker, Staff Engineer
Honde of America,
Information Services Group

©1999 APC All Trademarks are the property of their owners. APC1C9ES • (800)347-FAXX PowerFax • E-mail: apcinfo@apcc.com • 132 Fairgrounds Road, West Kingston, RI 02892 USA

FREE 68-page Guide to Power Protection

Learn how to protect any size system with APC legendary reliability.



Just mail or fax this completed coupon for your FREE 68-page Guide to Power Protection. Better yet, order it today at the APC Web site!

http://promo.apcc.com KEY CODE j355z

(888) 289-APCC x7495 • FAX: (401) 788-2797

APC
Legendary Reliability™

☐ **YES!** Please send me my FREE 68-page Guide to Power Protection.

☐ **NO,** I'm not interested at this time but add me to your mailing list.

Name: ______

Title: ______ Company: ______

Address: ______

City/Town: ______ State: ______ Zip: ______ Country ______

Phone: ______

Brand of UPS used? ______ # ______

Brand of PC used? ______ # ______

Brand of Servers used? ______ # ______

©1999 APC. All Trademarks are the property of their owners. APC4C8EB-US • E-mail: apcinfo@apcc.com • 132 Fairgrounds Road, West Kingston, RI 02892 USA

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST-CLASS MAIL PERMIT NO. 36 WEST KINGSTON, RI

POSTAGE WILL BE PAID BY ADDRESSEE

APC
AMERICAN POWER CONVERSION
KEY CODE: j355z
Department: B
132 FAIRGROUNDS ROAD
PO BOX 278
WEST KINGSTON RI 02892-9920

How to Contact APC

Call: (888) 289-APCC
use the extension on the reverse side

Fax: (401) 788-2797

Visit: http://promo.apcc.com
use the key code on the reverse side

APC
Legendary Reliability™

Internetworking Monitor . Kevin Tolly

TECHNOLOGY GLUT AND THE NETWORK

From the beginning, technology advancement has been the fuel that built and sustained the Wintel duopoly. A recent *Wall Street Journal* column, "Woe is Wintel," by Holman W. Jenkins, posits that technology advancement may well be Wintel's undoing. A surfeit of speed in microprocessor technology — a technology glut — may radically change buying habits and profits. Will the same be true for the network?

Since the first 808X machines appeared on desktops in the early 1980s, the acquisition of systems with faster microprocessors has been a pursuit of technophiles and casual users. And with each upgrade a perceptible improvement in performance could be observed. Those days may be over.

Jenkins observes: "If truth be told, Intel and AMD are now pushing chips operating at speeds — 500MHz and better — that are of little practical use to workaday computer users." Later, he adds: "Anybody who remembers the commoditization of memory chips in the 1980s must wonder if the same is now happening to the processor." And anyone who has been following the LAN switching market must wonder if the same could happen there.

There are parallels. Producers and consumers of LAN gear are, by and large, addicted to speed. This would be obvious even to a casual observer thumbing through advertisements in a trade publication. Right or wrong, power trumps function.

For more than a decade, internetwork vendors have been raising the bar on performance with LAN speeds increasing two orders of magnitude and port density skyrocketing from single-digit numbers to, in some cases, hundreds of high-speed ports in a single box. Are these "so advanced that they aren't really useful," or, like Intel's forthcoming Merced chip, "so powerful and irrelevant that [they] would immediately belong in a museum of the future?" Jenkins asks. When even "workgroup" 10/100M bit/sec switches can process frames at the rate of millions per second and pass traffic at gigabits per second (as they do already), one might wonder.

Fortunately for switch vendors, there are more differences than similarities between the two markets. While Cisco is often included as part of a Wintelco troika, Cisco has dozens of serious and effective competitors. Not only does this make cost per gigabit throughput an important factor, it also allows the array of features and management to come into play — as tiebreakers if nothing else.

Finally, where one microprocessor typically services a single user, that is never the case with LAN switches. Even in the smallest configuration, these devices aggregate traffic from multiple users. At the highest levels in the network hierarchy, one microprocessor may serve tens of thousands of users.

For the moment, at least, technology glut presents no imminent danger to network vendors. But longer term, that threat should not be dismissed.

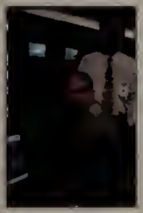
Tolly is president of The Tolly Group, a strategic consulting and independent testing firm in Manasquan, N.J. He can be reached at (732) 528-3300, ktolly@tolly.com or www.tolly.com.

fails, APC prevails

Networking

solutions
starting at $399

- Complete UPS protection for hubs, switches and routers
- Managed enclosures for every server platform and internetworking equipment
- Remote power management reboot and diagnosis
- User paging when network power anomalies occur
- User-replaceable and hot-swappable batteries
- Data, network and serial line protection



"APC NetShelters®...offered many advantages over conventional racks, such as great ventilation, mobility, and security management."

Joe Traina, Sales Representative,
AlphaNet Solutions, Inc.

Datacenters

solutions
starting at $3,599

- Power Array™ technology promises complete peace of mind for any size datacenter
- Scalability allows modular expansion and reconfiguration as your datacenter grows
- Symmetra™ reduces risk of system downtime with N+1 redundancy
- Complete solution integrates into all popular enterprise management solutions

"APC has innovative technology which promises reliability, Symmetra™ interacts smoothly with both hardware and software."

Ron O'Reilly, Field Support
Formerly Manager/IS,
Toyota Motor Sales, USA

Enterprise

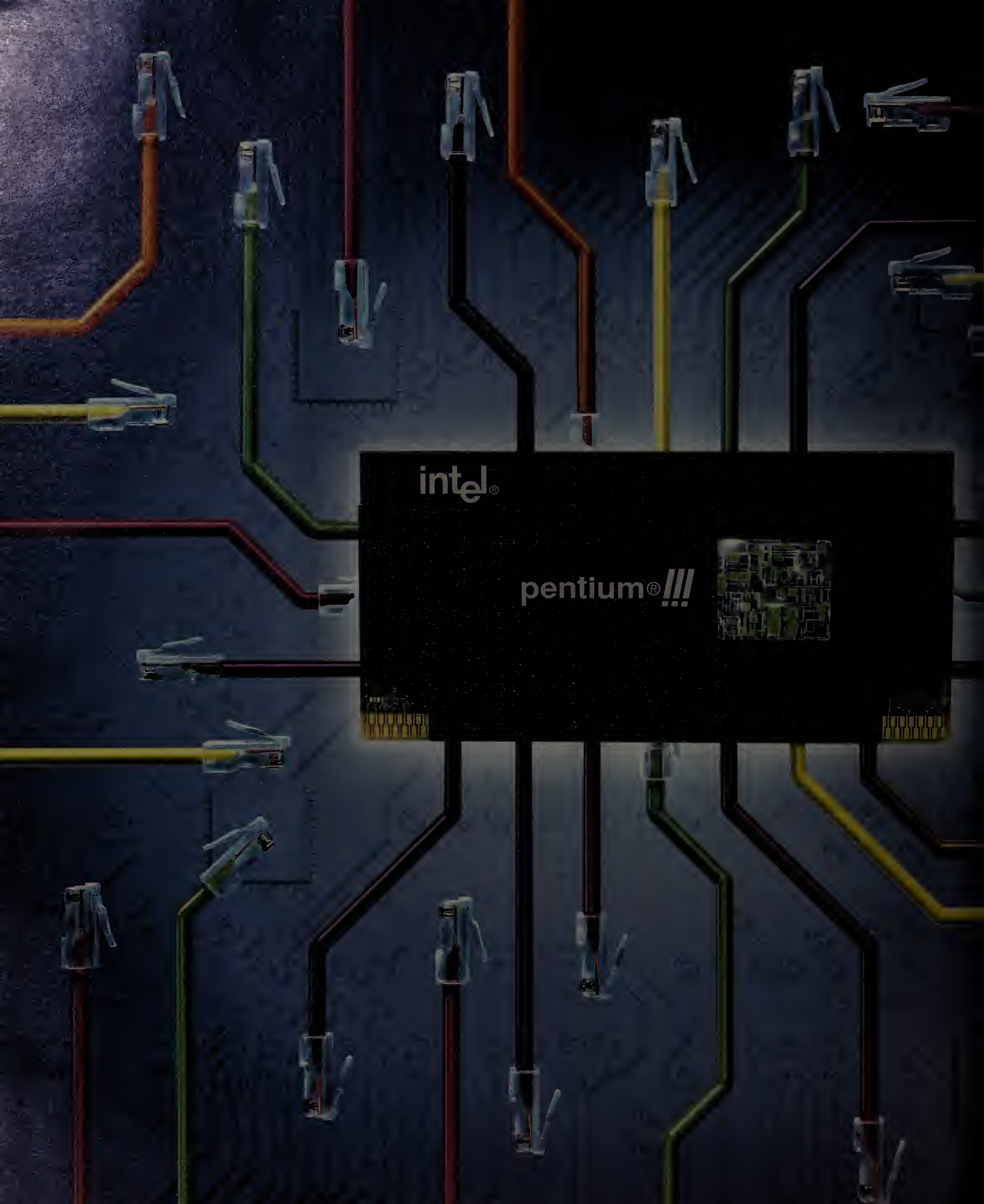
solutions
starting at $14,803

- For site-wide protection from 10kVA to infinity
- Innovative Delta conversion™ design means unmatched efficiency and low operating costs
- Small footprint saves facility space
- PowerAudit℠ physical consulting identifies problems before they occur

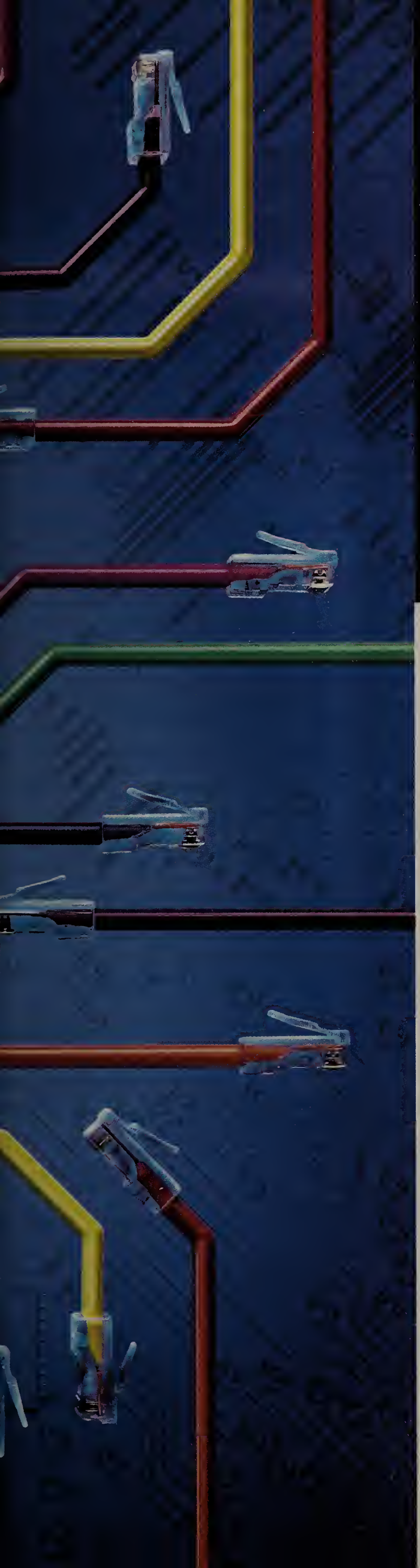
FREE 68-page Guide to Power Protection
VISIT http://promo.apcc.com
(888) 289-APCC x 7495 | KEY CODE j355z

APC
Legendary Reliability™

Free Product info enter NWInfoXpress #55 online @ www.networkworld.com/infoxpress



Information on Intel products and year 2000 is available at www.intel.com. © 1999 Intel Corporation. All rights reserved. Intel, Intel Inside and Pentium are registered trademarks, and Pentium III Xeon and "The Computer Inside" are trademarks of Intel Corporation. All other brands and trade names are the property of their respective companies.



New PC power
for the Net.

The new Pentium® III processor.
More power for your network, the Internet and beyond.

intel inside
pentium®!!!

It's a wired world. That's why you need the new Intel® processor designed for the Net: the Pentium® III processor. It gives you more power to run today's Net-based applications. And more power on the client can mean less stress on the Net. The Pentium III processor also helps you keep track of your networked resources. And, working in concert with a Pentium® III Xeon™ processor-based server, you have a powerful combination for your connected business. To learn more about the Pentium III processor, visit us on the Web, where you'll also find information on Intel® products and year 2000.*

► www.intel.com/it

intel®
The Computer Inside.™

SNA IN Y2K

SNA users stare down millennium bug

BY MARC SONGINI

The network executives at Dalhousie University in Halifax, Nova Scotia, are taking a novel approach to making their SNA network Year 2000-compliant: They're scrapping it.

At 12:01 a.m. on Jan. 1, 2000, the university will move its 20,000 users, many of them students, to an IP backbone. "We have an ancient system," says Ian Blair, general systems administrator in Dalhousie's IS department.

The university has a 15-year-old IBM mainframe anchoring the SNA network. IBM RS/6000 server technology will handle the new IP environment. The department had been planning to go to a pure IP network for years; the Y2K countdown provides a specific deadline, Blair says: "It's a way of forcing us to another platform."

Not all SNA users, however, are taking such a radical approach.

Users and vendors say the biggest Y2K problems the SNA community faces are home-grown SNA applications and outdated products that haven't received Y2K upgrades.

"Customers need to use appropriate diligence for the applications they have written themselves," says Ralph Case, chairman of the APPN Implementers Workshop (AIW), a consortium of SNA vendors that defines multivendor SNA interoperability specifications. "Users need to do their own evaluations," he says.

Look to vendors, third parties

Users with SNA products that have been discontinued should ask IBM or other vendors for specific details about how to make the products compliant.

The vendor may have a code fix or may be able to point to a service organization, such as IBM's mammoth Global Services Division and other third-party vendors, for testing and remediation, Case says.

IBM lists compliant products on a special Web site for network executives at http://wwwyr2k.raleigh.ibm.com.

The problem is that many existing computers and communications products were not designed nor configured to recognize the year 2000.

To save expensive memory and mainframe CPU cycle time, programmers have traditionally used dates with only the last two numbers of the year. That configuration means that come Jan. 1, 2000, many devices will read "00" as "1900," causing problems.

SNA: Slow Network Adaptation?

Less than 50% of U.S. SNA networks have been consolidated with IP.

Vendors have upgraded SNA products, but users need to double-check that home-grown applications are Y2K ready.

IBM's SNA Y2K checklist

A sampling of some SNA-related products and their Y2K status, from IBM's Y2K Web site:

Product	Y2K status
IBM Comm Server MVS/ESA 1.2	Ready
VTAM V2 for OS/VSI 2.1.0	Not ready
3725 Comm Controller	Ready
2216 Multi access Connector	Ready
3746 Multiprotocol Controller	Ready

For a complete list, see IBM's Y2K Web site at http://wwwyr2k.raleigh.ibm.com

"When you think about potential Y2K problems, you should look for things that depend on dates, like management reporting, remote start-ups, loading and configuration — things of that nature that have date and time dependencies," says Jim Goethals, an enterprise solutions product manager at IBM's Networking Hardware Division.

"There aren't really big issues for SNA except for the applications," says Robin Layland, principal of the Layland Consulting firm in West Hartford, Conn. "The only area people need to be careful in is network management automation apps. There are lots of embedded lists and controls people haven't looked at in 10 or 15 years."

Devices that could be affected by Y2K — such as legacy cluster controllers — probably aren't in use anymore.

Not a big issue

Indeed, for many SNA users, the Y2K issue has not been a major problem. IBM and others attribute that fact to planning: In 1996, the AIW and IBM agreed to study and fix SNA Y2K bugs. IBM and the AIW vendors, including Cisco, Nortel Networks, Hewlett-Packard, 3Com and about 20 other SNA suppliers, have for the most part made their current SNA products Y2K ready.

For example, in SNA's chief communications handling software — VTAM on the mainframe and NCP on front-end processors — IBM and AIW members agreed in 1997 to use a sliding date window in future code rather than the fixed two-digit date field found in most software. Pre-1997 releases may not be Y2K-compliant.

"As a rule of thumb, most of the fixes for the products have been inserted into the product upgrades," says Chris Holley, brand manager, Communications Server for OS/390. The majority of SNA vendors have made sure their products are compliant, he says.

The path to Y2K compliance

When Dillards, a retailer in Little Rock, Ark., began implementing Y2K fixes last year, the staff found the implementations to be straightforward and simple, says David McGhee, the company's manager of networking.

Adding the SNA Y2K-compliant products "was no more difficult than putting in a normal new release [of a product's operating system]," McGhee says.

"It seemed fairly painless to get things up to code," he adds.

The firm did extensive testing to make sure the SNA net was Y2K ready.

For example, the company dedicated a CPU in one of the firm's four mainframes to the tests and started running SNA applications as if it were 2000.

"Y2K was hardly any trouble at all," says Mike Basham, IT manager for application services for Wake County, N.C., whose data center is based in Raleigh.

The 3,000-node network handles a variety of applications from election results to tax information. "We didn't expect it to be a large problem," Basham says.

The SNA applications required only "a little tweaking, and [that we only had to make such small changes is] what surprised us," he says.

"The hard part was checking all the application code and making it able to handle the year 2000. The SNA and operating system portions were really clean," he says.

Luckily, Basham's in-house software programmers have intimate knowledge of the SNA applications they had written, and expect all their SNA applications to be Y2K-compliant by July 31.

big

technology features performance

small price

Now you can get Foundry's award-winning, customer-proven Layer 2/3/4 technology in a high density Fast and Gigabit Ethernet chassis. And at a price you can afford.

BigIron™ delivers up to 100,000,000 pps of Layer 2 switching and multi-protocol routing in a single device. With up to 64 Gigabit Ethernet and 184 Fast Ethernet ports, BigIron's non-blocking architecture can handle your toughest requirements. Plus, it's packed with the industry's most complete suite of features.

Best of all, BigIron won't blow your budget. You get all this and more for less than a tenth the price of traditional routers. What are you waiting for? It's time to call Foundry.

Call 1.888.TURBOLAN, email info@foundrynet.com or log into our web site at www.foundrynet.com for the sales representative nearest you.

FOUNDRY
NETWORKS

features

Route or Switch by Port

Multi-protocol Routing: IP, IPX, RIP, OSPF, Appletalk, BGP4 and VRRP

Layer 2/3/4 Switching

4 Levels of QoS

Multicast Support: IGMP, DVMRP, PIM

Layer 3/4 Filtering for Security

Inter-Switch Trunk Groups

Multi-Homed Servers

Hot Standby Redundancy

DHCP Assist

70 km Gigabit Ethernet Connectivity for MANs

IronSpan Meshed Connectivity

Comprehensive Network Management: SNMP, HP OpenView, CLI, Web, RMON

Free Product info enter NWInfoXpress #71 online @ www.networkworld.com/infoxpress

HEWLETT PACKARD

If your IT Management solution fails, which thank-you gift will the boss be sending you?

The word is out. Far too many enterprise management projects don't deliver. So, what's the hang up? Recent industry analyst studies reveal that most major framework implementations take too much time and don't deliver ROI. After years of work only a small portion of purchased functionality is actually implemented. There is a better way.

HP OpenView delivers measurable, proven results quickly and completely. A new independent head-to-head lab test[1] revealed "*HP delivers on the promise of integrated tools to solve specific problems... Unlike PLATINUM, CA and Tivoli, HP has not overloaded its solution with a common framework... HP's generally flawless solution sets the mark against which to measure all other out-of-the-box functionality*."

The OpenView approach is different from the "leap of faith" framework approach. Target your most pressing problem and solve it today.

HP OpenView. Reach your management goals without getting hung in the process.

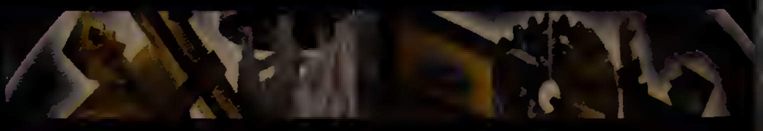
HP OPENVIEW

Works | Right | Now

LEARN WHY OPENVIEW HAS SO MANY SATISFIED CUSTOMERS:

HTTP://WWW.OPENVIEW.HP.COM
OR CALL 1·800·785·3925

ATTEND THE OPENVIEW FORUM & UNIVERSE CONFERENCE
APRIL 12-16, 1999 HYNES CONVENTION CENTER, BOSTON, MASSACHUSETTS.
VISIT OUR WEB SITE AT www.openview99.com



[1] Source: Network Computing, Syracuse University Real-World Labs®, 1999

Carriers & ISPs

The Internet, Extranets, Interexchange and Local Carriers, Wireless, Regulatory Affairs

Briefs

Global One, Sprint's international venture, last week launched Global Direct Link, a managed clear-channel point-to-point service. Global Direct Link provides links at speeds up to E-1 (2.048M bit/sec) among 23 countries. Positioned as an alternative to international private lines, Global Direct Link runs between Global One's ATM switches but provides dedicated — not shared — bandwidth. It also connects to Global One-affiliated metropolitan-area networks, particularly in Germany and France, where the dominant carriers are Sprint partners.

Global One: (800) 598-7572

ISP **Savvis Communications** is teaming up with **NorthPoint Communications** to offer digital subscriber line (DSL) Internet access in certain cities. The service will be offered in New York and San Francisco on April 1. Later this year, the service will be offered in St. Louis, Philadelphia, Dallas, Houston, Austin, Atlanta, Cleveland, Detroit and Pittsburgh. The DSL service speeds range from 128K bit/sec to 1.5M bit/sec. Pricing has not been set.

Savvis: (877) 728-8444

William Kennard, chairman of the **Federal Communications Commission,** last week traveled to Los Angeles to buck up the embattled E-rate subsidiary program for schools and libraries. He visited an elementary school that received $268,000 in E-rate funds to help wire classrooms for Internet access and other network needs.

He pointed out that the school had been built at the beginning of the century and lauded the opportunities students would now have "to work with computers, to be comfortable with this technology and to process information in new ways."

Remote access has its Y2K problems

Users wary of service provider claims that millennium bug will be eradicated.

BY TIM GREENE

SAN DIEGO — The fear of losing its remote access services to Year 2000 problems has Bank of America keeping its old direct-dial network from early retirement.

The bank is in the process of outsourcing its remote dial-up network to MCI WorldCom, but will keep its Ascend and 3Com terminal servers in place until sometime next year, just in case MCI WorldCom's network fails as a result of Y2K problems, according to Noel Johnston, consulting systems engineer at the bank's San Francisco office.

While carriers are working to bring their networks into compliance with the Y2K changeover, there are no guarantees that they will succeed.

That had remote access specialists concerned at the Gartner Group conference, held here recently. Gartner Group is a network consultancy based in Stamford, Conn.

Steve Gray, a connectivity manager for Southern Co., an electric utility in Atlanta, says Southern is confident in its own internal Y2K program.

But because its network service providers' readiness efforts are out of Southern's control, Southern cannot be guaranteed there won't be problems. "The problem is not us being Y2K-compliant, but other business partners being compliant," Gray says.

The best answer is to diversify service providers so that if one provider's network fails, the other's is there as a backup, says Eric Paulak, an analyst at Gartner Group. While having a backup is a basic rule of networking, it is one that sometimes gets overlooked, he says. As an example, he pointed to the widespread disruption of business last year when AT&T's frame relay network crashed.

Some remedies are simple for users to implement, Paulak says. For example, many corporations use 800 numbers for remote access. But not many know that for a penny more per call, 800 numbers can be split amongst carriers to share the calls. If one network has problems, the other one picks up the slack. "It costs more, but if you keep your company in business, it will be worth it," Paulak says.

For their part, carriers say they are working hard to bring their networks into compliance. For example, the regional Bell operating companies have tested their gear against each other's networks through a group they created called Telco Year 2000.

The goal of the group is to make sure that when 2000 rolls around, the carriers are able to set up calls among their networks. The group has completed one battery of tests and found that their networks will still work with each other (see graphic, page 32).

The carriers also say they are also correcting software so devices within their own networks will continue to work as the year expires.

Beyond questions about carrier readi-

See **Remote access**, page 32

FaxSav makes IP faxing easier

IP fax service coming for Microsoft, SAP and Lotus users.

BY DENISE PAPPALARDO

EDISON, N.J. — FaxSav is trying to make it easier for Microsoft, SAP and Lotus users to send IP faxes without deploying new costly fax server equipment.

FaxSav, a service provider that offers low-cost, worldwide fax-over-IP services to business users, is teaming with Fenestrae B.V. to offer users a simple on-ramp to FaxSav's network.

Fenestrae, of Leidschendam, Netherlands, last week introduced its Faxination 4.0 software, which runs on any Microsoft e-mail or SAP application server.

FaxSav is also developing software for Lotus Notes that will let users easily connect to the FaxSav network, says Thomas Murawski, CEO of FaxSav. That software is expected later this year.

While FaxSav has in the past teamed with fax server equipment manufacturers such as FaxRush, those deals required users to install additional hardware — usually a separate fax server. With Fenestrae, no additional equipment is required, and Faxination 4.0 requires no change to the existing client software. That's because Faxination 4.0 lets users send faxes via their existing Microsoft e-mail or SAP application interface instead of a special client that many stand-alone fax servers require.

After installing Faxination on their SAP or Microsoft server, network executives merely send user e-mail addresses to FaxSav to enable the service.

FaxSav customers will also find additional cost savings because they use their existing dedicated Internet access link to connect to FaxSav's network. FaxSav customers can also expect to save 50% to 60% on international faxes compared with sending faxes over the public switched telephone network.

Fenestrae's Faxination 4.0 software is available now through Fenestrae's domestic value added resellers. Faxination costs $2,895.

FaxSav: (800) 828-7115; Fenestrae: (770) 622-5445

More Online
FIND IT ON FUSION
DocFinder 2128
- A technical back grounder on [illegible] IP technology.
- Our free [illegible] newsletter on Internet services.

Remote access,
continued from page 31

ness, conference attendees were skeptical about whether to believe vendor claims that products they sell to corporate networks are Y2K-compliant.

For example, Microsoft last year announced that Windows NT was Y2K-compliant with a service upgrade, only to say later that it really wasn't (see related story, page 37).

While NT is not directly related to remote access, Y2K patches for firewalls or remote access switches could be just as faulty, according to John Girard, vice president of Gartner Group. "Anything that has more than 100 lines of code is very difficult to debug," he says.

With that in mind, Robert McKee, director of corporate information security for The Hartford insurance company, says he is looking for a backup to his Checkpoint firewall even though Checkpoint says the firewall is compliant. The risk that Checkpoint is wrong is just too great to take, McKee says. The contingency protection will not have all the features of the current firewall, but the network will be secure, he says.

Similarly, Questar Infocomm, a power company in Salt Lake City, is testing all of its remote access gear, regardless of vendor guarantees, according to Kenneth Kizer, a network support analyst at the company. 3Com says its hardware is Y2K-compliant and Raptor says its firewall is, too, but Questar has compliance tests scheduled for next month, Kizer says.

Telcos confident of Y2K prep

Phone companies, through their Year 2000 readiness industry group, performed 1,914 individual tests of network gear used to complete phone calls. The gear could pass, fail due to Y2K problems or fail for some other reason. Results:

Passed:	1,874
Failed:	6*
Non-Y2K failure:	34*

* Problems later corrected, retested and passed.

SOURCE: TELCO YEAR 2000, WASHINGTON D.C.

Bank of America is considering another twist on Y2K remote access challenges. Y2K failures, such as dead traffic lights or an inoperable public transportation system, could keep bank employees from getting to work, even if the bank's network is still running, Johnston says.

To meet that possibility, the bank is considering expanding its remote access program so workers stranded at home could dial in to work and keep the bank running. "In that case, remote access would be a business resumption tool," he says.

So the bank is trying to figure out how many people it would want in the program and how much it wants to spend to set it up, Johnston says.

Facing the same possibility in Oklahoma, the state Department of Human Services could expand its remote access program relatively easily, according to Marquette Youngblood, the department's administrator of networking and strategic planning.

The department is using Nortel Networks' Contivity gear to support an Internet virtual private network that requires remote users to have a browser and a thin Nortel VPN client, Youngblood says.

Workers with a home PC and Internet access could then connect to the office. "We could roll that out to every user," he says. ◪

We'll tell you which light just went out.

Get customizable device insight for everything on your network.

There is a new level of valuable information on your network. Details about each device that could help you spot trouble before it becomes a problem.

Now you can use any Java-enabled browser to configure NetPrism to look into every SNMP device – even if you have a heterogeneous network. NetPrism simplifies the monitoring of all your servers, routers, switches, and printers.

NetPrism also works with network managers, like HP OpenView, to help you ensure all the right lights are lit while you oversee network traffic patterns. And at only $995, NetPrism pays for itself quickly.

NetPrism™
Device Insight

Download a 60-day trial version at www.netprism.com or call today at 800-545-6774.

FUJITSU

©1999. Fujitsu Software Corporation. NetPrism, the NetPrism logo, and "Device Insight" are trademarks of Fujitsu Software Corporation. Fujitsu and the Fujitsu logo are trademarks of Fujitsu Limited. All other product names are the property of their respective holders.

NWInfoXpress #72 @ **www.networkworld.com/infoxpress**

NetworkWorld FREE Subscription Application!

THE NEWSWEEKLY OF ENTERPRISE NETWORK COMPUTING

☐ **YES** I want to receive/continue to receive my FREE subscription to *Network World.*

No, thank you. ☐

Sign Here

Signature (required) ____________________ Date

TO QUALIFY: You must supply your company name and address. If military, please specifiy branch/base. If government, please specify division.

Name ____________________ Title ____________________

Company ____________________

Division/Mail Stop/Military Branch or Base ____________________

Street Address ____________________

City ____________________ State ____________________ Zip ____________________

If there is a parent company, please provide name: ____________________

☐ My home address is also my business address.

Optional delivery address: Enter your home address below if your company will not accept delivery at your business address:

Street Address ____________________ City ____________________ State ____________________ Zip ____________________

Business phone (_____) ____________________ FAX (_____) ____________________

Internet E-mail address ____________________

Would you like to receive our weekly e-mail news update "inFusion" ? ☐ Yes ☐ No

Would you like to receive periodic information via e-mail on 3rd party networking products/services? ☐ Yes ☐ No

Publisher reserves the right to serve only those individuals who meet publication qualifications.
ALL questions must be answered. Incomplete forms will not be processed. Free subscriptions available to qualified
US applicants. Foreign and Canadian rates available upon request.

B399

1. What is the principal business activity at your location?

(check ONE only)

01. ☐ Manufacturing (other)
02. ☐ Finance/Banking
03. ☐ Insurance/Real Estate/Legal
04. ☐ Health Care Services
05. ☐ Hospitality/Entertainment/Recreation
06. ☐ Media/TV/Cable /Radio/Print
07. ☐ Retail/Wholesale Trade/Business Services
08. ☐ Transportation
09. ☐ Utilities
10. ☐ Education
11. ☐ Process Industries (Mining/Construction/Petroleum Refining/Agriculture/Forestry)
12. ☐ Government (Federal/State/Local)
13. ☐ Military
14. ☐ Aerospace
15. ☐ Consulting (Independent)*
16. ☐ Carriers/Interconnects
17. ☐ Internet Service Provider (ISP)
18. ☐ Manufacturing (Computer/Communications/OEM)
19. ☐ Resellers of Computer/Network Products (VARs, VADs)
20. ☐ Systems/Network Integrators*
21. ☐ Distributors (Computer/Communications)*
22. ☐ Other (please specify) ____________________

** Please complete form based on largest client.*

2. What is your job function?

(check ONE only)

NETWORK IS MANAGEMENT:

1. ☐ Network Management
2. ☐ LAN Management
3. ☐ Datacom/Telecom Management
4. ☐ IS/IT/MIS/CIO/Systems Management
5. ☐ Internet/Intranet/Electronic Commerce Mgmt., Webmaster
6. ☐ Engineering Management
7. ☐ Corporate Management (CEO, Pres., VP, Dir., Mgr., Financial Management)
8. ☐ Consultant (Independent)
9. ☐ Other ____________________

3. What is the estimated value of Network equipment and services that you specify, recommend or approve the purchase of?

(Please print the appropriate number code on the line next to each product category. Please complete ALL categories A–N.)

1. $100 Million or more
2. $50 Million to $99.9 Million
3. $25 Million to $49.9 Million
4. $10 to $24.9 Million
5. $1 to $9.9 Million
6. $100,000 to $999,999
7. $50,000 to $99,999
8. Under $50,000
9. None of the above

A ______ Large Systems (Mainframes/Minis)
B ______ Desktops (Micros/Laptops/Workstations)
C ______ Servers
D ______ LANs
E ______ WAN Equipment
F ______ Carrier Services
G ______ Internetworking
H ______ Internet
I ______ Intranet
J ______ Extranet
K ______ Remote Access
L ______ Peripherals
M ______ Software
N ______ Service/Support

4. What is the total number of sites for which you have purchase influence?

(check ONE only)

1. ☐ 100+ 2. ☐ 50 – 99 3. ☐ 20 – 49 4. ☐ 10 – 19 5. ☐ 2 – 9 6. ☐ 1 7. ☐ None

5. What is the total number of Servers/Clients/LANs installed/planned at your location/in your entire organization?

(check ONE box in each column)

SERVERS At Location A		SERVERS Entire Org. B	CLIENTS At Location C		CLIENTS Entire Org. D	LANS At Location E		LANS Entire Org. F
☐	1. 50,000+	☐	☐	1. 50,000+	☐	☐	1. 50,000+	☐
☐	2. 10,000 to 49,999	☐	☐	2. 10,000 to 49,999	☐	☐	2. 10,000 to 49,999	☐
☐	3. 1,000 to 9,999	☐	☐	3. 1,000 to 9,999	☐	☐	3. 1,000 to 9,999	☐
☐	4. 100 to 999	☐	☐	4. 100 to 999	☐	☐	4. 100 to 999	☐
☐	5. 50 to 99	☐	☐	5. 50 to 99	☐	☐	5. 50 to 99	☐
☐	6. 10 to 49	☐	☐	6. 10 to 49	☐	☐	6. 10 to 49	☐
☐	7. 1 to 9	☐	☐	7. 1 to 9	☐	☐	7. 1 to 9	☐
☐	8. none	☐	☐	8. none	☐	☐	8. none	☐

6. What is your scope and involvement in purchasing decisions for network products and services for your enterprise?

A. Scope (check one only)

1. ☐ Corporate/Enterprise
2. ☐ Department
3. ☐ None

B. Involvement (check ALL that apply)

1. ☐ Create Network Strategy
2. ☐ Recommend/Specify
3. ☐ Approve
4. ☐ Evaluate
5. ☐ Determine the Need
6. ☐ None

7. What is the estimated number of employees at your location/in entire organization?

(check ONE in each section)

A. At your location:

1. ☐ Over 20,000
2. ☐ 10,000 – 19,999
3. ☐ 5,000 – 9,999
4. ☐ 2,500 – 4,999
5. ☐ 1,000 – 2,499
6. ☐ 500 – 999
7. ☐ 250 – 499
8. ☐ 249 or less

B. Entire organization:

1. ☐ Over 20,000
2. ☐ 10,000 – 19,999
3. ☐ 5,000 – 9,999
4. ☐ 2,500 – 4,999
5. ☐ 1,000 – 2,499
6. ☐ 500 – 999
7. ☐ 499 or less

8. Please indicate the products/services that you are currently involved in purchasing or plan to purchase:

(check ALL that apply)

A. Currently involved in purchasing B. Plan to purchase

INTERNET/INTRANET

A B
☐ 01. ☐ Internet Services/Web Hosting
☐ 02. ☐ Firewalls/Security/Encryption
☐ 03. ☐ Web Servers/Software
☐ 04. ☐ Web Servers/Hardware
☐ 05. ☐ TCP/IP Software
☐ 06. ☐ Management/Monitoring Software
☐ 07. ☐ Voice/Video Over IP
☐ 08. ☐ VPN Equipment/Services
☐ 09. ☐ Legacy Integration Tools (Web to Host)
☐ 10. ☐ Web Development Tools (JAVA, ActiveX, etc.)
☐ 11. ☐ Push Technology
☐ 12. ☐ Web Browsers
☐ 13. ☐ Intranet Applications/Groupware
☐ 14. ☐ Search/Retrieval Products (web crawler)
☐ 15. ☐ Electronic Commerce Tools
☐ 16. ☐ Web Authoring Tools
☐ 17. ☐ Other ____________________

LOCAL-AREA NETWORKS/ INTERNETWORKING

A B
☐ 18. ☐ Local-Area Networks
☐ 19. ☐ Network Operating System Software
☐ 20. ☐ Servers
☐ 21. ☐ Print Servers
☐ 22. ☐ Routers
☐ 23. ☐ ATM Switches
☐ 24. ☐ Token-Ring Switches
☐ 25. ☐ Ethernet Switches
☐ 26. ☐ Fast Ethernet
☐ 27. ☐ Gigabit Ethernet
☐ 28. ☐ Layer 3 Switches
☐ 29. ☐ Network Storage Devices (NASs, SANs)
☐ 30. ☐ LAN Storage/Backup
☐ 31. ☐ Optical Storage/Backup/Jukeboxes
☐ 32. ☐ Disk Storage/Backup
☐ 33. ☐ Tape Storage/Backup
☐ 34. ☐ RAID Storage/Backup
☐ 35. ☐ Network Test/Diagnostic Tools
☐ 36. ☐ Cables, Connectors, Baluns
☐ 37. ☐ UPS
☐ 38. ☐ Network Interface Cards (NICs)
☐ 39. ☐ Hubs
☐ 40. ☐ Intelligent Hubs
☐ 41. ☐ Stackable Hubs
☐ 42. ☐ Bridge/Router
☐ 43. ☐ SNMP Network Management
☐ 44. ☐ Gateways
☐ 45. ☐ Concentrators/Repeaters
☐ 46. ☐ Other (please specify) ____________________

COMPUTERS/PERIPHERALS

A B
☐ 47. ☐ Thin Clients/Network Computers (NCs)
☐ 48. ☐ Laptops/Notebooks/Sub-Notebooks
☐ 49. ☐ Micros/PCs
☐ 50. ☐ Minis
☐ 51. ☐ Mainframes
☐ 52. ☐ Workstations
☐ 53. ☐ Printers/Network Printers
☐ 54. ☐ CD-ROM/DVD
☐ 55. ☐ Fax/Modem Boards
☐ 56. ☐ Memory/Chips/Boards/Cards
☐ 57. ☐ Other ____________________

REMOTE/WIRELESS COMPUTING

A B
☐ 58. ☐ Remote Access Products
☐ 59. ☐ Remote Access Services
☐ 60. ☐ PDAs
☐ 61. ☐ PCMCIA Devices
☐ 62. ☐ Wireless Data Equipment/Services
☐ 63. ☐ Cellular Equipment & Services
☐ 64. ☐ Other (please specify) ____________________

SOFTWARE/APPLICATIONS

A B
☐ 65. ☐ Network Management
☐ 66. ☐ Systems Management
☐ 67. ☐ Security
☐ 68. ☐ Communications Software
☐ 69. ☐ Terminal Emulation
☐ 70. ☐ Operating Systems
☐ 71. ☐ Applications Development Tools
☐ 72. ☐ Database Management/ RDBMS
☐ 73. ☐ Groupware
☐ 74. ☐ Workflow
☐ 75. ☐ EDI
☐ 76. ☐ E-mail
☐ 77. ☐ Desktop Videoconferencing
☐ 78. ☐ Imaging
☐ 79. ☐ Suites/Server Suites (Back Office, etc.)
☐ 80. ☐ Middleware
☐ 81. ☐ Document Management
☐ 82. ☐ Site Metering Tools
☐ 83. ☐ Computer Telephony Integration (CTI)
☐ 84. ☐ Data Warehousing
☐ 85. ☐ Anti Virus Software
☐ 86. ☐ Multimedia
☐ 87. ☐ Yr. 2000 Conversion Software (Y2K)
☐ 88. ☐ Helpdesk
☐ 89. ☐ Web Based Management Tools
☐ 90. ☐ Directory Services
☐ 91. ☐ Other (please specify) ____________________

WIDE-AREA NETWORK EQUIPMENT & SERVICES

A B
☐ 92. ☐ 56 Kbps Modems
☐ 93. ☐ Under 56 Kbps Modems
☐ 94. ☐ Cable Modems
☐ 95. ☐ Asynchronous Transfer Mode (ATM)
☐ 96. ☐ Frame Relay Equipment/Services
☐ 97. ☐ ISDN Equipment & Services
☐ 98. ☐ FT-1/T-1/T-3 Multiplexers/Services
☐ 99. ☐ xDSL Services/Products
☐ 100. ☐ Diagnostic/Test Equipment
☐ 101. ☐ DSU/CSU
☐ 102. ☐ PBXs
☐ 103. ☐ Videoconferencing
☐ 104. ☐ Leased Lines
☐ 105. ☐ Switched Data
☐ 106. ☐ Virtual Private Networks (VPN)
☐ 107. ☐ FRADs
☐ 108. ☐ Managed LAN/Router Services
☐ 109. ☐ Other ____________________
☐ 110. ☐ Outsourcing/Systems Integration Services
☐ 111. ☐ Education/Training Services
☐ 112. ☐ None of the above (1–111)

9. Please indicate the platforms that are currently installed/planned:

(check ALL that apply)

A. Currently installed B. Planned for purchase

NETWORK PROTOCOLS

A B
☐ 01. ☐ TCP/IP
☐ 02. ☐ IPv6
☐ 03. ☐ SNA
☐ 04. ☐ Novell IPX/SPX
☐ 05. ☐ APPC/APPN/LU 6.2
☐ 06. ☐ NETBIOS
☐ 07. ☐ NFS
☐ 08. ☐ SNMP
☐ 09. ☐ Other ____________________

LAN ENVIRONMENT

A B
☐ 10. ☐ Gigabit Ethernet
☐ 11. ☐ Switched Ethernet
☐ 12. ☐ Fast Ethernet (100 Megabit Ethernet)
☐ 13. ☐ Ethernet
☐ 14. ☐ ATM
☐ 15. ☐ Token Ring/Token Ring Switching
☐ 16. ☐ IP Switching
☐ 17. ☐ Layer 3 Switching
☐ 18. ☐ FDDI
☐ 19. ☐ 100Base-T
☐ 20. ☐ 10Base-T
☐ 21. ☐ Fibre Channel
☐ 22. ☐ Other ____________________

NETWORK OPERATING SYSTEM

A B
☐ 23. ☐ Windows NT
☐ 24. ☐ Windows NT/Advanced Server
☐ 25. ☐ Novell IntranetWare
☐ 26. ☐ Novell (NetWare 5.X)
☐ 27. ☐ Novell (NetWare 4.X)
☐ 28. ☐ Novell (NetWare 2.X, 3.X)
☐ 29. ☐ Microsoft (LAN Manager)
☐ 30. ☐ Banyan (VINES)
☐ 31. ☐ IBM (Server)
☐ 32. ☐ Other (please specify) ____________________

COMPUTER OPERATING SYSTEM

A B
☐ 33. ☐ NT Server
☐ 34. ☐ NT Workstation
☐ 35. ☐ Unix/Xenix/AIX/SCO
☐ 36. ☐ Solaris
☐ 37. ☐ Windows
☐ 38. ☐ Windows 95
☐ 39. ☐ Windows 98, .9x
☐ 40. ☐ DOS
☐ 41. ☐ OS/2, OS/2 Warp
☐ 42. ☐ IBM MVS/VM/VSE
☐ 43. ☐ Digital VMS
☐ 44. ☐ Macintosh
☐ 45. ☐ Other ____________________
☐ 46. ☐ None of the above (1–45)

10. Which of the following Servers/Clients do you have installed/planned at your location?

(check ALL that apply in each column)

	A. Servers		B. Clients		A. Servers		B. Clients
Power PC	☐	01.	☐	486, 386, 286	☐	07.	☐
Power Mac	☐	02.	☐	Sun Sparc	☐	08.	☐
Mac Other	☐	03.	☐	Risc	☐	09.	☐
Multiprocessor Servers	☐	04.	☐	Alpha	☐	10.	☐
Pentium II (PII)	☐	05.	☐	Other	☐	11.	☐
Pentium/Pentium Pro	☐	06.	☐				

11. Which of the following hardware platforms are installed/planned in your company?

(check ALL that apply)

A - Mainframes (Large Scale)

1. ☐ IBM
2. ☐ Amdahl
3. ☐ Cray
4. ☐ Hitachi
5. ☐ Unisys
6. ☐ Other ____________________

B - Minis (Midrange)

1. ☐ IBM RS/6000
2. ☐ IBM AS/400
3. ☐ Digital
4. ☐ Tandem
5. ☐ Unisys
6. ☐ AT&T GIS
7. ☐ H-P
8. ☐ Data General
9. ☐ Other ____________________

C - Workstations

1. ☐ Sun Microsystems
2. ☐ Silicon Graphics
3. ☐ Digital
4. ☐ H-P
5. ☐ IBM
6. ☐ Other ____________________

12. What is the estimated gross revenue of your entire company/institution?

(check ONE only)

01. ☐ $20 billion or more
02. ☐ $10 billion to $19.9 billion
03. ☐ $1 billion to $9.9 billion
04. ☐ $500 million to $999.9 million
05. ☐ $100 million to $499.9 million
06. ☐ $50 million to $99.9 million
07. ☐ $10 million to $49.9 million
08. ☐ $5 million to $9.9 million
09. ☐ $4.9 million or less
10. ☐ None of the above

13. For which areas outside of North America do you have purchase influence?

(check ALL that apply)

1. ☐ Europe 2. ☐ Asia 3. ☐ South America 4. ☐ Australia 5. ☐ Middle East 6. ☐ None

Please indicate the names and job functions of other individuals at your location to whom you would like us to send a copy of **NetworkWorld**

NAME ____________________ JOB FUNCTION ____________________

NAME ____________________ JOB FUNCTION ____________________

NAME ____________________ JOB FUNCTION ____________________

NAME ____________________ JOB FUNCTION ____________________

NAME ____________________ JOB FUNCTION ____________________

Be Sure You Have Completed the Following:

☑ Answered ALL the questions

☑ Signed and dated the form

☑ Provided your name, title and company address

Thank You!

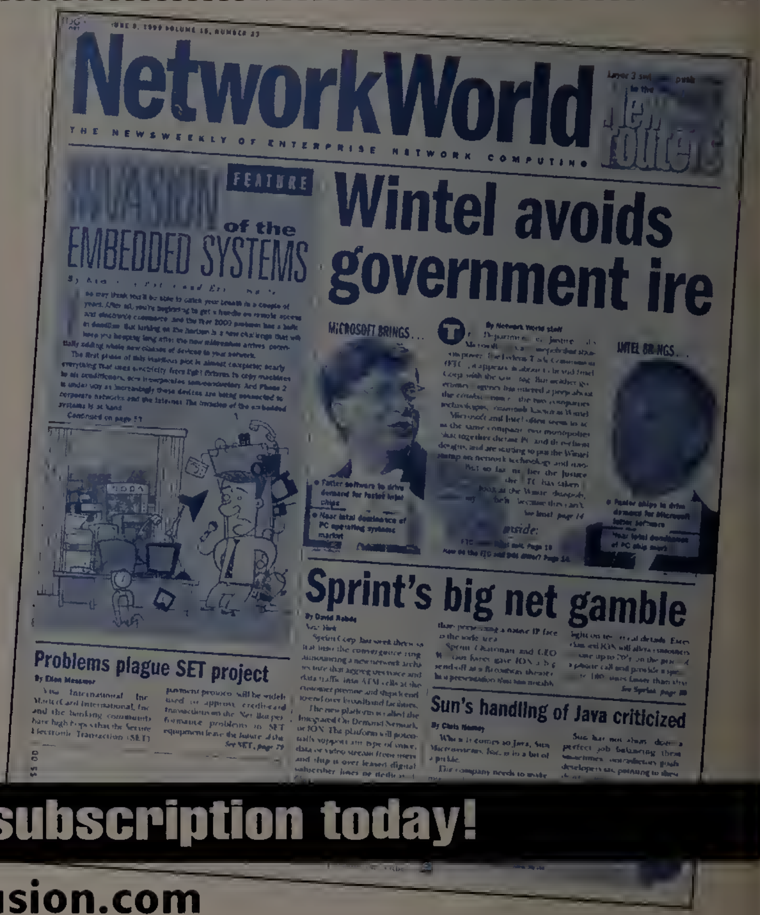
▼ 1. FOLD HERE & MAIL TODAY ▼

NetworkWorld

THE NEWSWEEKLY OF ENTERPRISE NETWORK COMPUTING

We're not just the #1 networking newsweekly...we're a full-service company providing you with the best information resources to help you conquer your networking challenges. Your qualified subscription brings you...

- 51 FREE issues of *Network World* magazine
- FREE access to **NW Fusion**, THE web site for the Network IS industry
- Access to *Network World* software, seminars and more!



NetworkWorld

THE NEWSWEEKLY OF ENTERPRISE NETWORK COMPUTING

FEATURE

INVASION of the EMBEDDED SYSTEMS

Wintel avoids government ire

Sprint's big net gamble

Problems plague SET project

Sun's handling of Java criticized

Send for your FREE Network World subscription today!

or apply on-line at: http://www.nwfusion.com

▼ 2. FOLD HERE & MAIL TODAY ▼

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST-CLASS MAIL PERMIT NO 1752 NORTHBROOK IL

POSTAGE WILL BE PAID BY ADDRESSEE

NetworkWorld
THE NEWSWEEKLY OF ENTERPRISE NETWORK COMPUTING
PO BOX 3091
NORTHBROOK IL 60065-9928

Networking in a New Light: Extending Fiber Beyond the Backbone

Fiber or copper? Which to choose? As IT professionals expand their network or look for additional bandwidth, they are faced with a dilemma when choosing premises cabling. Fiber and copper cable vendors alike are touting dramatic advances that present compelling reasons to install one or the other. They can't both be right.

To answer that question, you need to think about cabling in a new light. Join *Network World* and The Tolly Group, along with 3M and Corning, at a dynamic, interactive, half-day seminar designed to help you make the mission-critical decisions that will improve the quality of your network.

This FREE 1/2 day seminar provides you with insight into 3M and Corning innovations in fiber technology and offers these additional benefits:

Discover the business advantages of both fiber and copper cabling in today's high-performance networks.

Explore the cost savings associated with the new "passive wiring closet" design.

Explore new designs in fiber optic solutions that have fundamentally altered the copper vs. fiber decision.

Develop a cabling strategy that will scale for five to ten years.

Ask questions of John Curtis, 3M and Corning representatives during the interactive roundtable and Q&A sessions.

Enter to win a free DVD Player at each seminar

To register: call **888-800-6300**
or visit us on the web at
www.nwfusion.com/seminars/3m

PRODUCED BY:
NetworkWorld

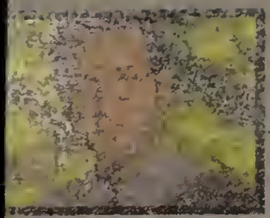
CO-SPONSORED BY:
CORNING

Seminar Schedule

4/27/99	**New York**
4/28/99	**Boston**
5/5/99	**Chicago**
5/6/99	**Washington, DC**
5/18/99	**Dallas**
5/19/99	**Atlanta**
6/2/99	**Seattle**
6/3/99	**Minneapolis**
6/15/99	**San Francisco**
6/16/99	**Los Angeles**

Keynote Address by John Curtis
THE TOLLY GROUP

3M Volition™
Fiber to the desk. Today



Eye on the carriers . David Rohde

AT&T NEEDS TO BELIEVE IN WHAT IT SELLS

AT&T says it wants to be your voice and data, circuit and packet, dial-up and dedicated, domestic and international, telephony and cable, anything-you-want company.

But deep down, does anyone at AT&T besides Chairman Mike Armstrong really believe it?

It seems that every time a new opportunity presents itself at AT&T, the company fumbles around for a year or two, finally announces a service, and then is shocked — *shocked!* — to find that people actually want to buy it.

In 1994 and 1995, AT&T began selling frame relay, then failed to provision enough switches to handle the demand. In 1997 and 1998, in the midst of a national bandwidth crunch, AT&T practically ran out of T-1 ports. Now AT&T is surprised by a barrage of dial-up Internet traffic generated by a new flat-rate offer, and it's belatedly hustling to install more modems and access lines.

What part of the Internet and data-network revolution don't the folks in Basking Ridge get yet?

Usually when AT&T enters a field late, its marketing people boast that the power of the AT&T brand name will make up for any tardiness. Indeed! If I were Sprint, MCI WorldCom or another carrier, I might be bitter about AT&T's dumb luck in snaring customers when it isn't really ready to serve them.

AT&T should be treating new opportunities for what they are — manna from heaven. Although AT&T's profits have been improving, Armstrong and other top managers keep expressing concern that its revenue seems to stay flat every quarter. But until now, AT&T's overall corporate strategy for maintaining revenue has been largely defensive.

Did you know AT&T's basic daytime long-distance charge — if you're not on a rate plan and haven't switched carriers — is still 28 cents per minute? Egged on by too many Wall Street analysts, AT&T has been trying to hold on to a rate base that is bound to die. And AT&T's rate plan isn't working anyway. Most of the 10-10 calling plans pecking away at AT&T are lousy. But it's AT&T's fault for setting such a high ceiling and allowing clever schemers to offer plans to save "50% or more."

This kind of backward-looking approach isn't going to cut it any more. Every AT&T unit should be following the example of the AT&T Solutions managed-service business and setting high goals for new business, not fearfully protecting old installed bases.

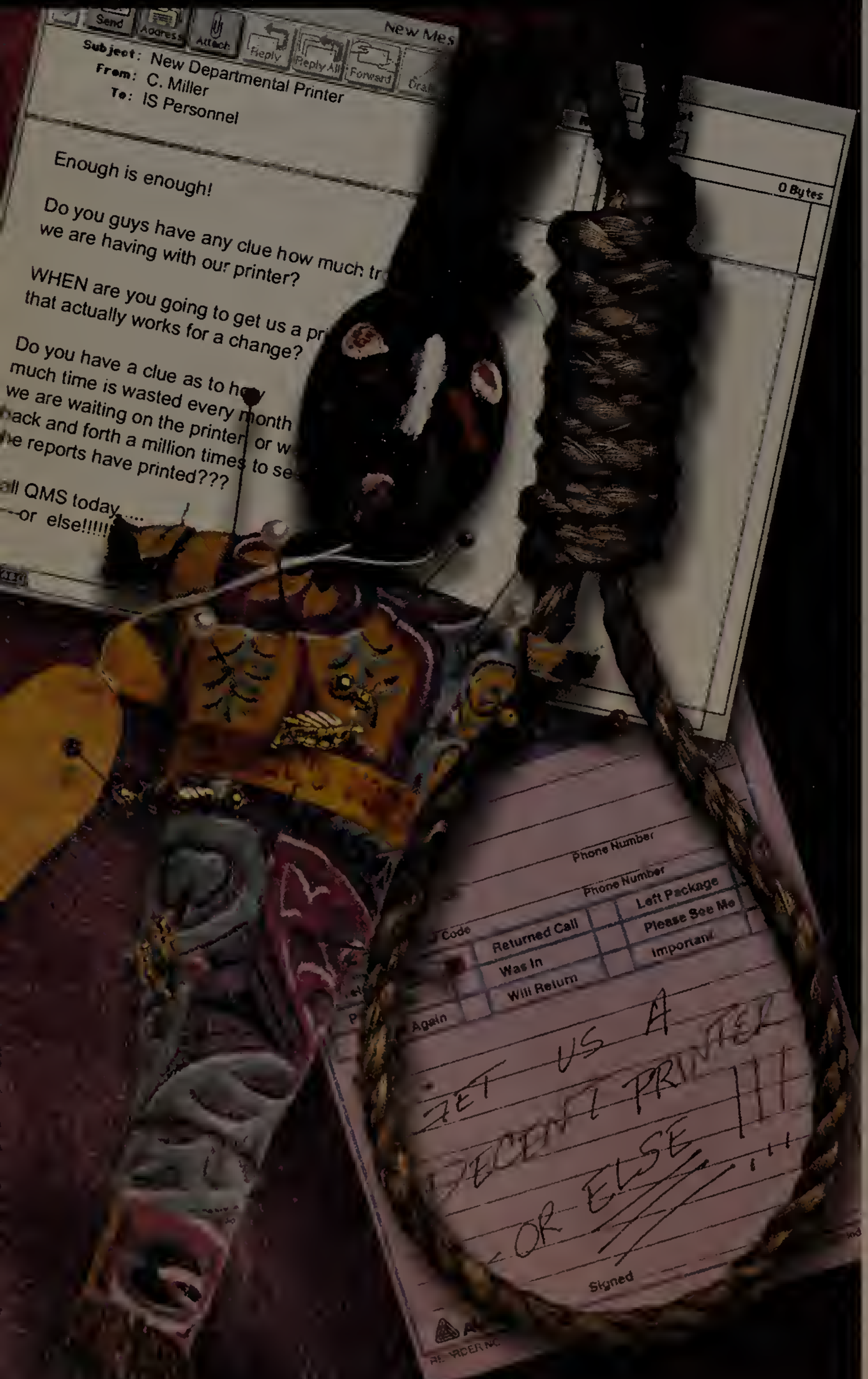
That means an end to the tiny trials that AT&T conducts after grandiose announcements in fields such as fixed-wireless local loop and voice over IP. These groups should get the money they need to really make a go of their ventures.

There's an old saying that executives get into trouble when they start believing their own press releases. AT&T's problem is the reverse — some of its executives don't really believe what the company is saying about the Internet and network convergence. Executives should go back, read their announcements and get it in their bones that AT&T really believes in the new world of networking. It does, doesn't it?

Rohde is a senior editor with Network World. *He can be reached at drohde@nww.com.*

IT, MIS, LAN professionals:

Tired of all the hate email, death threats, surly co-workers, the evil eye, and those stupid dolls riddled with pins that sorta, kinda resemble yourself?



Subject: New Departmental Printer
From: C. Miller
To: IS Personnel

Enough is enough!

Do you guys have any clue how much tr
we are having with our printer?

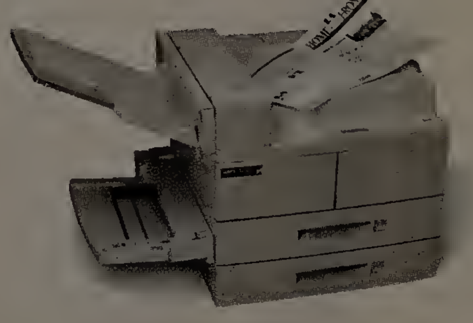
WHEN are you going to get us a pr
that actually works for a change?

Do you have a clue as to h
much time is wasted every month
we are waiting on the printer or w
back and forth a million times to se
he reports have printed???

all QMS today....
—or else!!!!!

GET US A DECENT PRINTER —OR ELSE!!!

GSA contracts available.



Then meet your new best friends... QMS® 3260 & 4032 Print Systems

- **Speed and Performance** Unbelievably fast for workgroup printing — from 32 to 40 ppm
- **Powerful Crown® Controller** Job spooling, multiprotocol, serverless printing
- **Network Ready** 10BaseT/100BaseTX Ethernet
- **CrownAdmin 3** Manage and configure any network printer remotely
- **CrownView** Monitor and configure the printer with any Internet browser
- **Email Paging** Let the printer notify you when it needs attention — via email or pager
- **Auto-Install Utilities** Easy set-up, easy to use
- **Documents on Demand** 3,550 sheets maximum input; duplex, staple, collate, and job offset
- **It Copies, Too** Add copy capabilities for only $399*
- **The Right Price** Starting at $3,199*; 1¢ per page at 5% coverage

Everything you ever wanted in a workgroup printer, and then some!

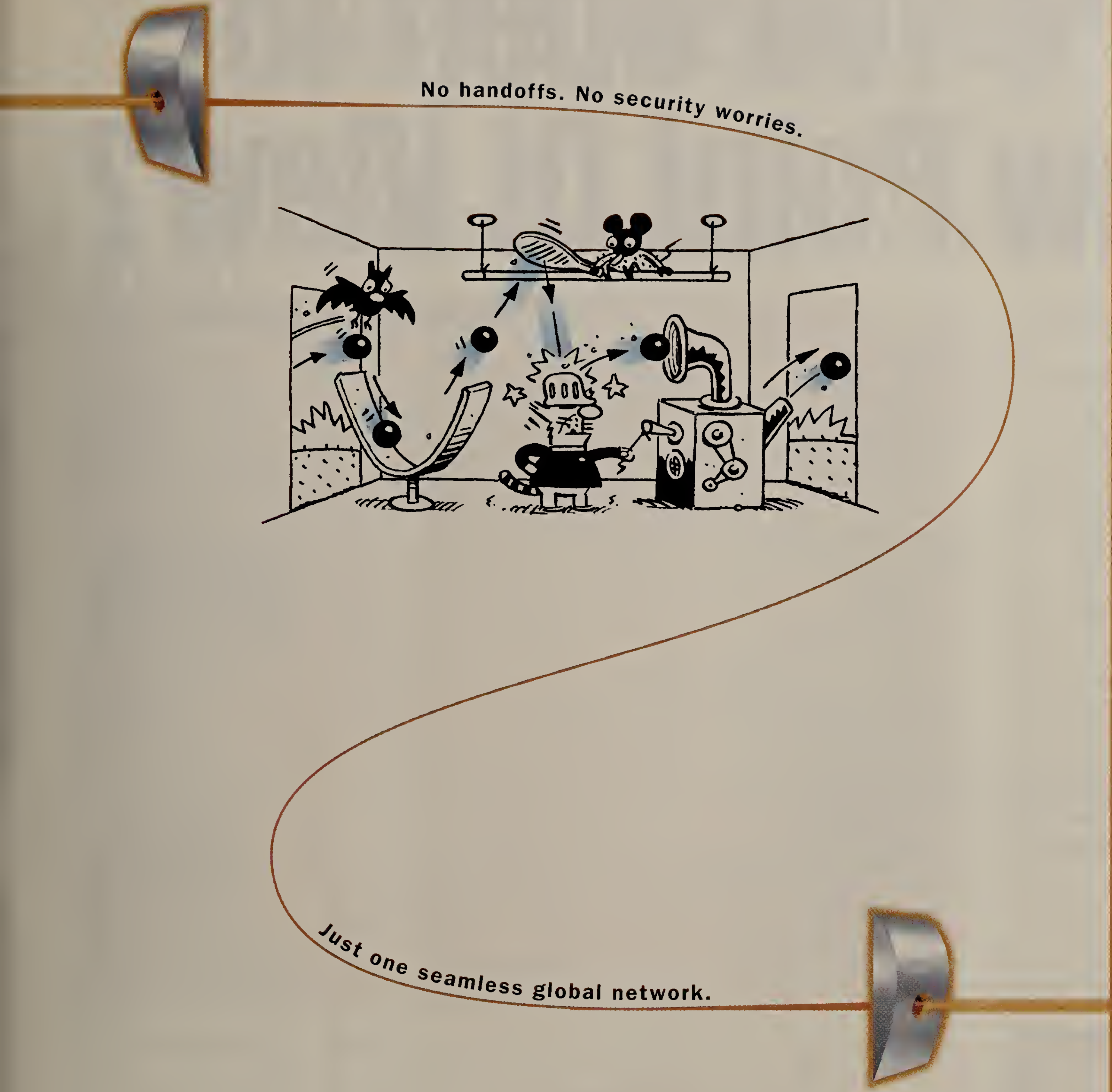
QMS

1-800-523-2696
www.qms.com

*All prices in US dollars

©1998 QMS, Inc. QMS, the QMS logo, Crown, CrownAdmin, and CrownView are registered trademarks of QMS, Inc. All other trademarks or registered trademarks are the property of their respective manufacturer. 12/98

NWInfoXpress #63 @ www.networkworld.com/infoxpress


No handoffs. No security worries.
Just one seamless global network.

MCI WORLDCOM

ON-NET DATA SERVICES

ONE NETWORK

END-TO-END

NO HANDOFFS

MCI WorldCom On-Net Services have taken all of the risk out of data transmission. Gone are the days of handoffs to other carriers and wondering who's got your data. With on-net services your data simply goes from point A to point B. Just one seamless global network, owned and operated by one company.* MCI WorldCom.℠ How do we do this? By linking the U.S. and Europe with the most advanced underwater cable ever constructed. And by owning local facilities in more than eighty U.S. markets, as well as several markets in Europe. Whether your needs are local, national or international, you deal with one dedicated account team for everything. Pretty straightforward, isn't it? Introducing MCI WorldCom On-Net Services. For details, visit wcom.com

*Only MCI WorldCom owns the entire network from origin to destination in many locations worldwide. MCI WorldCom is traded on NASDAQ under WCOM. For more information on MCI WorldCom, visit our Web sites at mciworldcom.com and wcom.com © 1999, MCI WORLDCOM, Inc. All Rights Reserved.

Free Product info enter NWInfoXpress #78 online @ **www.networkworld.com/infoxpress**

Are You Open To A New Point Of View?

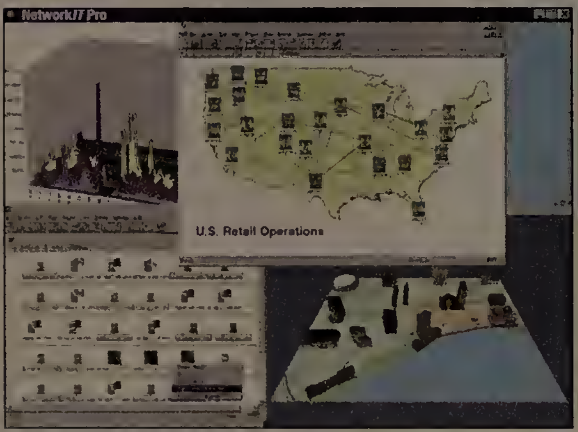
Now more than ever, you need the most advanced and powerful network management software you can find.

That's why so many network managers today are switching to Network/*IT*™ Pro. Because it gives you total control—exactly what you need to deliver the quality of service your users have all been demanding.

Not only can you identify the impact network problems have on your business, you can resolve them before users are ever affected. Network/*IT* Pro optimizes performance, provides enhanced manageability, and dramatically reduces downtime.

It also provides substantially more functionality than any other network management solution. Whether it's ATM, Frame Relay or Switch, TCP/IP or IPX, DECNet or SNA, Network/*IT* Pro gives you a consistent way to manage your entire network, across any platform, protocol, or network operating system.

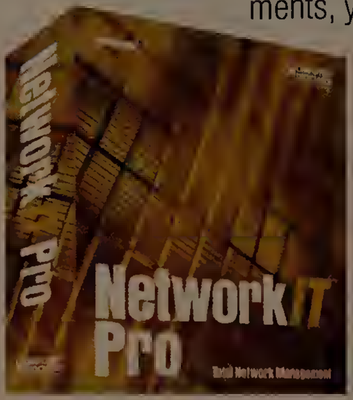
	Network/*IT* Pro	**HP OpenView**
2-D Map	✓	✓
3-D Real World Interface™	✓	
Agent View	✓	
Automatic Baseline Calculation	✓	
Business Process Views™	✓	
Calendar	✓	
Configuration Wizard	✓	
DHCP Synchronizer	✓	
DMI Discovery	✓	
DNS Discovery	✓	
Distributed State Machine	✓	
Event Management	✓	✓
Built-In Event Correlation	✓	
Frame Relay Option	✓	
Frame Relay Service Option	✓	
Historical Trending	✓	✓
Layer 2 Topology Maps	✓	✓
Network Management Policies	✓	
Object Repository	✓	
Performance Scope	✓	✓
Built-In RMON Analysis	✓	



Network/*IT* Pro *views your entire network from a business perspective.*

And with its centralized, policy-based approach, aligning network management to business objectives has finally become a reality.

Best of all, Network/*IT* Pro is part of CA's family of acclaimed management products built on a common framework. So, as your role evolves to encompass other enterprise requirements, you can incrementally implement additional solutions in an integrated fashion. Just what you would expect from the industry leader in network and systems management.



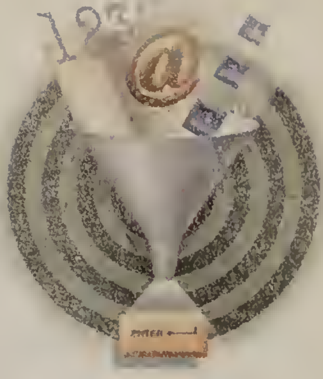
To change your network management point of view, visit our website at **www.cai.com/ads/networkitpro** or call **1-877-2 GO FOR IT.**

COMPUTER® ASSOCIATES
Software superior by design.

Network/*IT*™ Pro

©1999 Computer Associates International, Inc., Islandia, NY 11788-7000. All product names referenced herein are trademarks of their respective companies. All information herein is based on publicly available information as of 9/15/98.

Free Product info enter NWInfoXpress #68 online @ **www.networkworld.com/Infoxpress**



Briefs

Lucent later this month plans to ship an encryption card for Lucent PortMaster 3 remote access concentrators. The IP Security daughtercard supports the IPSec standard or Layer 2 Tunneling Protocol over any network transport. The card can encrypt data traffic between remote access points at up to 1.1M bit/sec. The IPSec daughtercard costs $1,295.
Lucent: (925) 730-2705

Encryption comes to PortMaster 3 thanks to an IPSec daughtercard.

Messaging and directory software maker **Isode** has added a double dose of anti-spam protection to its Internet/X.400 Message Switch 4.1. Sender and recipient authorization checks are now conducted before the message enters the switch.

The product also features support for the Realtime Blackhole List, which identifies known sources of spam. Prices start at $1,800 for a workgroup server with up to 100 mailboxes.
Isode: (512) 231-8993

Help desk giant **Remedy** today will announce a line of Web-centric applications to automate purchasing. The Remedy@Work suite includes Purchasing@Work for the buying of nonproduction materials and services, SetUp@Work for bringing on new employees and ExpensAble@Work for handling expense reporting. Purchasing@Work is available now and starts at $100,00.
Remedy: (650) 903-5200

Internet Explorer 5: Have it your way

BY LEE SCHLESINGER, TEST CENTER DIRECTOR

First Look

If there's a single word that best describes the new release of Microsoft's Web browser, it might be "customizable."

Users can tailor the look and feel of Internet Explorer 5 in unprecedented ways, and administrators can create custom-tailored versions with the exact configurations they want.

Administrators will like the Internet Explorer Administrator Kit. The kit lets you create an installation file that gives users a version of Internet Explorer 5 with the custom settings you choose. You can restrict users from changing settings in the browser and even some on the desktop — for instance, you can remove Windows' Run command. You can then release your custom setup file to your users on CD-ROM or via a Web site. The only problem we had with the kit was its inability to preconfigure more than 50 favorites (Microsoft's term for bookmarks) for users — a low number, in our estimation.

Interoperability advances

Internet Explorer 5 is a refreshing break from the typical autocratic Microsoft application. It plays nice with applications from other vendors. You can associate any e-mail or newsreader program with Internet Explorer 5 as helper applications.

The same holds true for HTML editing, and calendar and contact manager applications, though Internet Explorer 5 didn't recognize Symantec's Act! on our system.

Netscape bookmarks are imported automatically when you install Internet Explorer 5. You can now organize Internet Explorer 5 favorites in non-alphabetical order. Unfortunately, the two features don't go together; when you import bookmarks they get reordered alphabetically.

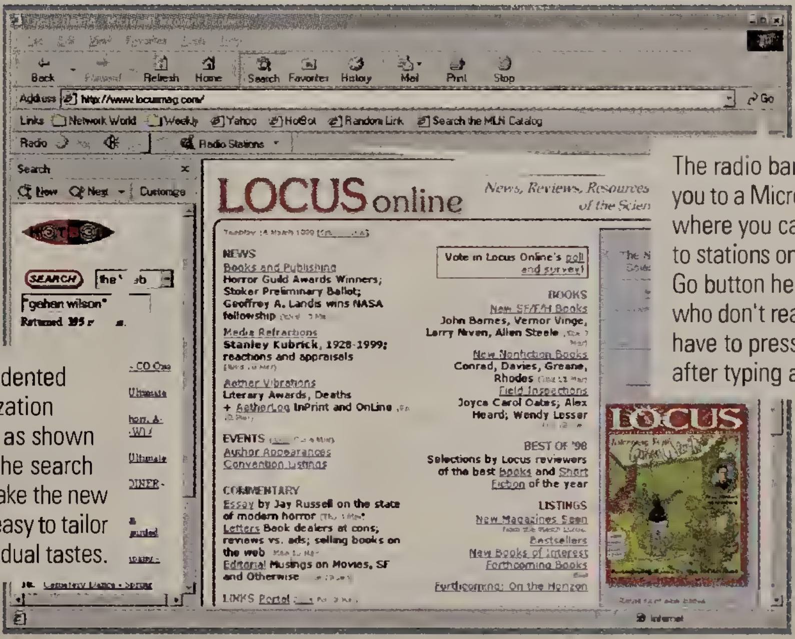
Old dog, new tricks

Microsoft has learned a few tricks from Netscape. The first time you run Internet Explorer 5, it offers to make msn.com your home page, just as Netscape does with Netcenter. At least Microsoft asks. Internet Explorer 5 also gives you the choice of preserving your existing file type associations. Otherwise Internet Explorer 5 will make itself the default application for launching or viewing certain file types.

See **Internet Explorer**, page 42

The new Internet Explorer

Version 5 of Microsoft's browser gives users new tools and configuration options.



LOCUS online

News, Reviews, Resources of the Scien

NEWS
Books and Publishing
Horror Guild Awards Winners; Stoker Preliminary Ballot; Geoffrey A. Landis wins NASA fellowship
Media Refractions
Stanley Kubrick, 1928-1999: reactions and appraisals
Aether Vibrations
Literary Awards, Deaths
+ AetherLog InPrint and OnLine

EVENTS
Author Appearances
Convention Listings

COMMENTARY
Essay by Jay Russell on the state of modern horror
Letters Book dealers at cons; reviews vs. ads; selling books on the web
Editorial Musings on Movies, SF and Otherwise

LINKS Portal

Vote in Locus Online's poll and survey!

BOOKS
New SF/F/H Books
John Barnes, Vernor Vinge, Larry Niven, Allen Steele
New Nonfiction Books
Conrad, Davies, Greene, Rhodes
Field Inspections
Joyce Carol Oates; Alex Heard; Wendy Lesser

BEST OF '98
Selections by Locus reviewers of the best books and Short Fiction of the year

LISTINGS
New Magazines Seen
Bestsellers
New Books of Interest
Forthcoming Books
Forthcoming: On the Horizon

Unprecedented customization options, as shown here in the search pane, make the new version easy to tailor for individual tastes.

The radio bar sends you to a Microsoft site where you can listen to stations online. The Go button helps users who don't realize they have to press Enter after typing a URL.

Vendors changing their Y2K minds

BY PAUL MCNAMARA

Here's one reason why making your network Year 2000-compliant is so difficult: Vendors can't make up their minds.

According to data compiled by Infoliant, which monitors Y2K compliance information for more than 30,000 network applications and hardware products, 20% of that total have seen compliance status changes since the Pittsburgh company began keeping tabs in 1997.

Status categories include compliant, action required, noncompliant, evaluation pending, and vendor will not test. In many cases, vendors are changing the status to "vendor will not test," leaving customers holding the Y2K bag.

Between November 1998 and February, Infoliant tracked more than 2,000 status changes or other record revisions from vendors, the highest total it has seen to date. Last month there were 316 status changes, with 122 indicating at least the potential for previously undisclosed problems.

According to Kevin Weaver, executive vice president at Infoliant, an increasing number of the 600 vendors being tracked have been reclassifying products to "vendor will not test." Sixty-six such changes were noted during this four-month period, including products from Cisco, Digital, Informix, Lotus, Ascend and Apple.

"Nothing here indicates that a particular manufacturer has gone through and dumped a majority of their products," Weaver says. "It tends to be one or two products at a time."

Few vendors seem to be immune,

See **Y2K**, page 44

Microsoft Research readying its new Millennium

BY SANDRA GITTLEN

REDMOND, WASH. — Walking around the halls of Microsoft Research's spacious new building on the outskirts of the company campus, it's obvious the software giant is going through a growth spurt. Maintenance crews are everywhere helping the more than two dozen research teams put the finishing touches on their offices and meeting rooms.

Tucked in one corner on the second floor of Building 31, researchers Richard Draves and Galen Hunt are hard at work on Millennium, a hot project Microsoft hopes will pave the way for high-powered applications. Microsoft is counting on projects such as Millennium to justify an increase in its $3 billion research and development budget and the swelling of its research staff from 400 to 600 by the end of 2000.

Draves says that developers of high-powered applications have been stymied by a lack of processing power at the desktop. So he and his Systems and Network Group are developing Millennium, a distributed operating system that harnesses the computing power of various devices such as desktop PCs and servers on the network and offers them to applications and users as a single resource.

Other research groups such as the Database Group and the Virtual Worlds Group could exploit as much power as end users are given, Hunt says. For instance, the Virtual Worlds group wants to combine 3-D graphics, speech recognition and other resource-sapping features into a single application, but the group is limited by what the desktop can handle.

"We are trying to make the task of developing distributed applications simpler by abstracting away the details of individual computers and networks," says Rick Rashid, vice president of Microsoft Research.

Already, the Millennium team has three prototypes — Borg, Coign and Continuum — which it is testing on Microsoft's next wave of applications, such as PhotoDraw 2000 and Office 2000.

The first, Borg, is a Java Virtual Machine that distributes objects and applications across the network without the user noticing. For instance, if a user has a monstrous spreadsheet, Borg can take parts of it and spread them around the network to get the optimal processing power, Hunt says.

The second, Coign, is an automated distributed partitioning system for Common Object Model (COM) systems. COM is Microsoft's framework for supporting components. Coign divides the application between the server and the desktop. With Coign, a graphics-intensive package such as Microsoft's PhotoDraw 2000 could determine at boot-up how best to distribute itself in the network. "It can redistribute the application every time you run it," Hunt says. This ability can lead to a 50% performance improvement, he adds.

The third prototype, Continuum, is a dynamic version of Coign. Instead of being limited to distributing itself at boot-up, an application with Continuum can redistribute itself as it is running. While this can cause processing overhead, Hunt says the performance gains of dynamic reallocation are worth it.

Microsoft has no rollout date set for Millennium. However, Hunt says his team is working with product groups, such as COM+, to include some of the new technologies, such as the partitioning features of Coign in their next round of offerings. ◪

PROFILE: MICROSOFT RESEARCH

Leadership:	Nathan Myhrvold, chief technology officer; Rick Rashid, vice president; Dan Ling, director
Located:	Redmond, Wash.
Founded:	1991
Hot projects:	Millennium, a distributed operating system; AutoAdmin, a tool to ease database setup and administration; Phoenix, a project to protect databases and applications from crashes; Flatland, a 3-D virtual worlds application.
Employees:	400
Fun fact:	The Virtual Worlds Group is teaming with The Fred Hutchinson Cancer Center in Seattle to create a 3-D virtual world for cancer patients to communicate with each other and their families and friends.

Nathan Myhrvold, chief technology officer
Rick Rashid, vice president
Dan Ling, director

More Online

- **Microsoft Research projects.**
- **The top three research executives discuss some secrets to their success.**

DocFinder
FIND IT 2122 ON FUSION
www.nwfusion.com

F5 can Xerox your Web site

BY ROBIN SCHREIER HOHMAN

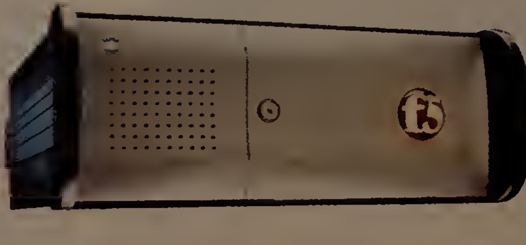
SEATTLE — F5 Labs will ship a new network appliance this summer that promises to speed Web traffic and make replicating and updating local and distributed Web servers faster and easier.

The stand-alone Global/Site box serves as a staging area for new Web content. Users send new content, including applications, to Global/Site, which distributes and synchronizes that content to servers across the LAN and WAN. The most interesting feature is Global/Site's ability to send only data that has changed, saving time and bandwidth. There's also a rollback feature, which can restore previous versions of a Web site.

Global/Site works with F5's BIG/ip, a local server load balancer, and 3DNS, a distributed local load balancer.

Last month, F5 made a deal with Cabletron to allow the switch vendor to first resell, and then integrate, BIG/ip's features into Cabletron's SmartSwitch Router.

Global/Site won't work for real-time applications, such as airline reservations, or on any transaction that uses a relational database.


Global/Site works with F5's BIG/ip to speed Web traffic and ease server updates.

Global/Site has a single CPU, up to 1G byte of RAM, and links for Ethernet, Fast Ethernet and Gigabit Ethernet.

Global/Site is scheduled to ship this summer. It will cost $19,900 for a single site for local use and an astounding $49,900 each for multiple distributed sites. If that doesn't set off bells, do the math: $19,900 for one site, double that for two sites, and you get $99,800?

An F5 spokesman said: "It's aggressively priced for an entry-level site," and, "We think the $50,000 per site is absolutely fair market value — in fact, it's a little inexpensive." That extra $30,000 per box includes installation and a year of 24-7 support.

F5 will apply the $19,900 toward an upgrade, if you decide to go the distributed route.

F5: (206) 505-0800

Want to migrate from Token-Ring to Fast Ethernet in 5 minutes?

No problem.

A unique solution to a common problem – now it only takes 5 minutes to migrate from Token-Ring to Fast Ethernet.

Olicom's new CrossFire™ 8730 Fast Ethernet Translation Switch is the first in an innovative new range of products giving Token-Ring users seamless, wire-speed access to Fast Ethernet networks. With Olicom's expertise and products, we can make that duty effortless.

Priced well below competitive solutions, the 20-port CrossFire 8730 leverages Olicom's Token-Ring expertise to resolve the complex technical issues of connecting Token-Ring LANs to Fast Ethernet installations. The result is a Fast Ethernet Switch with Token-Ring robustness. Standard features include Plug and Play installation, automatic configuration, impressive performance, a host of user-friendly management capabilities, and advanced auto-recovery technology for ensuring mission-critical availability.

olicom
ClearStep℠
The Token-Ring Migration Strategy

The CrossFire 8730 is just one of many exciting solutions described in ClearStep℠, Olicom's unique migration strategy for cost-effectively upgrading Token-Ring customers to future-proof, high-speed, mission-critical networking. If you would like more information about how Olicom's new range of Fast Ethernet products can boost your network performance, please visit www.olicom.com or call **1-800-841-9292** for further details.

olicom

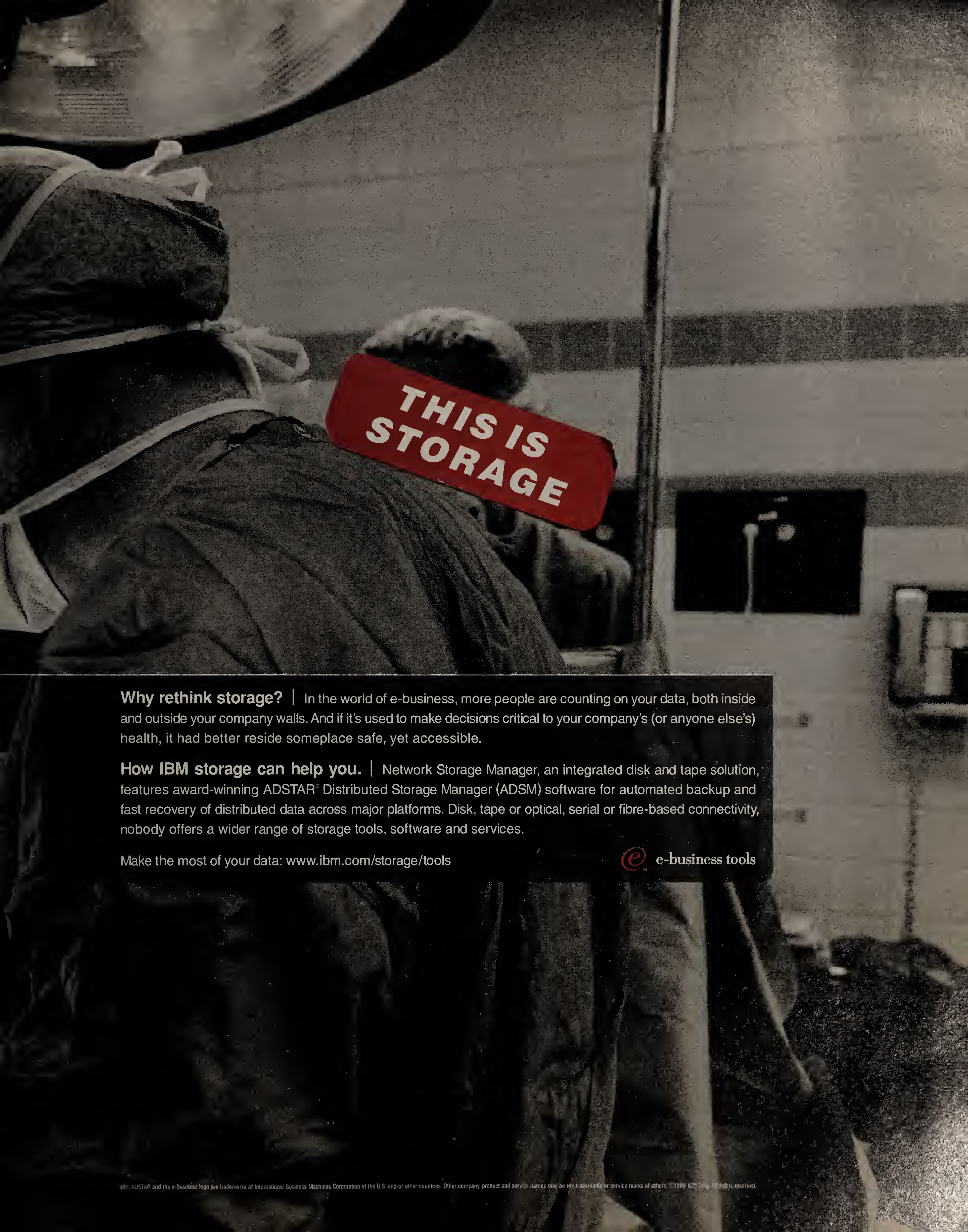
Olicom offices: USA (+1) 972 907 4600, Australia (+61) 2 9955 1755, Benelux (+31) 73 6 49 15 46, Canada (+1) 416 977 2400, Denmark (+45) 45 27 00 00, France (+33) 1 4191 1717, Germany (+49) 6105 2892-0, Ibérica (+34) 91 372 9814, Japan (+81) 3 5753 0221, Poland (+48) 58 348 15 00, South Africa (+27) 11 432 3295, Sweden (+46) 8 594 704 94, United Kingdom (+44) 1494 556600. **www.olicom.com**

CrossFire is a trademark, and ClearStep is a service mark of Olicom A/S. Olicom is a registered trademark. 1999 copyright Olicom A/S.

Free Product info enter NWInfoXpress #61 online @ **www.networkworld.com/infoxpress**

Emergency. | Doctors quickly pull up medical history on interhospital network. Warning: ceftriaxone antibiotic allergy.

IBM



Why rethink storage? | In the world of e-business, more people are counting on your data, both inside and outside your company walls. And if it's used to make decisions critical to your company's (or anyone else's) health, it had better reside someplace safe, yet accessible.

How IBM storage can help you. | Network Storage Manager, an integrated disk and tape solution, features award-winning ADSTAR® Distributed Storage Manager (ADSM) software for automated backup and fast recovery of distributed data across major platforms. Disk, tape or optical, serial or fibre-based connectivity, nobody offers a wider range of storage tools, software and services.

Make the most of your data: www.ibm.com/storage/tools

e-business tools

IBM, ADSTAR and the e-business logo are trademarks of International Business Machines Corporation in the U.S. and/or other countries. Other company, product and service names may be the trademarks or service marks of others. © 1999 IBM Corp. All rights reserved.

Internet Explorer,
continued from page 37

If you want to keep your file associations, you have to know where to look. You'll find the opt-out check box under an Advanced button during the installation process.

Internet Explorer 5's history list is more helpful than Navigator's. You can actually view which day you last visited a site. We wish, however, that history items were ordered chronologically and not alphabetically; that option is only available for the current day's sites.

Microsoft created a new Links bar that's analogous to Netscape's Personal Toolbar. You can delete default links or move them out of that folder and replace them with links of your choice.

Let there be music

Internet Explorer 5 also has a few new sound tricks, such as an optional radio bar that lets you tap into feeds from a couple of dozen local radio stations, including National Public Radio.

You can also install a host of other linked products, including a new, enhanced version of Windows Media Player, a full-featured multimedia client, and Microsoft Chat, an IRC client.

Microsoft has added features that should be helpful for new users. For instance, an Internet connection wizard helps novices set up their connections, then deletes itself from the desktop.

There have also been a number of usability enhancements, such as autocompletion of URLs and the automatic launching of native editors for recognized file types — that is, Internet Explorer 5 will now launch Word to open a .DOC file.

The concepts of subscriptions and channels have been de-emphasized. Subscriptions are now called offline browsing. To designate a page for offline viewing, you have to check a box associated with that page under the Organize Favorites menu. The Channels button has been pulled off the button bar and out of Internet Explorer 5 and logically grouped with Active Desktop instead.

> **■ *Despite Microsoft's assertions that it had made stability a priority, Internet Explorer 5 terminated abruptly twice in the week or so we tested it.***

We still had a few minor quibbles with Internet Explorer 5. You still can't show only text on the navigation bar buttons, though you can replace the default large icons with smaller ones.

And despite Microsoft's assertions that it had made stability a priority, Internet Explorer 5 terminated abruptly twice in the week or so we tested it. Still, Internet Explorer 5 marks the first time Microsoft has released a browser that stacks up well against the shipping version of Netscape Navigator. ◪

Get more information online. DocFinder: 2130
www.nwfusion.com

WORLDWIDE LEADER IN SECURE ENTERPRISE NETWORKING

Know Exactly Who's Doing a Number on Your Network.

Fred in Marketing
"Power User." Merciless tweaking kills entire subnets.
192.168.91.152
Al in Accounting
Steals bandwidth to feed streaming audio habit.
192.168.35.101
Sid in Delivery
Hacker-in-training practices on your routers.
192.168.74.165
Marci in Sales
Constantly on the run; changes address daily.
192.168.219.88

Control Security by Name and Number with Meta IP™ User-to-Address Mapping™

What users do to your network can be downright criminal. You can positively identify the culprits with Meta IP and its unique User-to-Address Mapping service. UAM correlates dynamic address assignments with Windows NT and Novell login names. So instead of 192.168.253.100 causing a problem, you'll know right away it's Alice in HR.

But Meta IP doesn't just solve problems. It prevents them, by automating IP addressing and naming across large, multi-site networks. Meta IP integrates DNS and DHCP, synchronizes them via dynamic DNS updates, and lets you manage all its services through a common interface. You can extend automated, reliable addressing to every node, without sacrificing user accountability.

In fact, Meta IP can make your entire network more secure, through its integration with Check Point FireWall-1® and VPN-1™. It lets you implement security policies for dynamically addressed users. You get the convenience of DHCP, and your users get a single sign-on solution.

With Meta IP, your users will stray less often. And when they do, you'll be able to quickly mend the error of their ways.

Download our free demo and investigate Meta IP for yourself. Call 1-800-META-463 or visit www.metaip.checkpoint.com.

- Network Security
- Traffic Control
- IP Address Management
- OPSEC Alliance
- Integrated Policy Management

CHECK POINT™
Software Technologies Ltd.

©1999 Check Point Software Technologies Ltd. All rights reserved. Check Point, the Check Point logo, FireWall-1, VPN-1, Meta IP and User-to-Address Mapping are trademarks or registered trademarks of Check Point Software Technologies Ltd. or its affiliates. All other product names mentioned herein are trademarks or registered trademarks of their respective owners. The products described in this document are protected by U.S. Patent No. 5,606,668 and 5,835,726 and may be protected by other U.S. Patents, foreign patents, or pending applications.

Free Product info enter NWInfoXpress #75 online @ **www.networkworld.com/infoxpress**

“I know where my business can go. Who’ll work with me to take it there?”

Our Managed and Professional Services team has the experience you need for your distributed computing environment. Sprint has managed complex networks and helped businesses succeed for over 20 years. Our solutions include award-winning security services, Cisco Gold Certified managed network services and web hosting. And through our IT consulting division, Sprint Paranet, we analyze your business to provide a “road map” for achieving your goals. From simple help desk support to complex network architectures, we’ll design a system that aligns your IT and business objectives. The result? Improved operating efficiency and resource allocation, reduced crisis management and better end-user services. So work with Sprint and take your business wherever you want it to go.

1·888·378·5566 www.sprint.com/IT-services

A team with

expertise

Sprint®

We help your business do more business®

©1999 Sprint Communications Company L.P.

Y2K,
continued from page 37

according to Weaver. "I've seen Year 2000 products that have required patches," he says.

For customers, the result is a forced upgrade or the prospect of facing Jan. 1, 2000 without a Y2K blessing on some part of their networks.

According to network managers and industry analysts, most customers are accepting the changes with resignation, if not exactly good cheer.

Deny, deny, deny

Others, however, are operating oblivious to the changing landscape, one expert says.

Companies that fail to keep tabs on changing compliance information "don't know what they're missing," says Andy Bochman, a Y2K specialist with Aberdeen Group in Boston. Companies that monitor the updates often don't like what they discover, he adds.

"Those who have seen compliance ratings change from better to worse are irate," Bochman says. "Still, I would rather have the truth about products than what sounds good."

Ron Bronson, a technical development engineer at Boise Cascade in Itasca, Ill., says his company's Y2K effort has not had serious setbacks arise from vendor change-of-status reports. However, Cascade remains on guard.

"We're probably about 80% sure that [current information] will hold fast," Bronson says. "There's definitely some worry there . . . but there's not a lot we can do about it."

Ready or not?

Vendors have been wavering over whether their products are ready for the millennium.

Vendor	*Products that have changed status	Percentage of products tracked
Integraph	66	24.9
Dell	69	23.1
WRQ	29	19.9
NEC Technologies	45	15.3
Sterling Software	49	15.0
Novell	53	13.8
Microsoft	149	13.4
Banyan	33	12.8
Motorola	22	12.1
Netscape	22	11.3
Tivoli	19	10.6

*Totals reflect Y2K compliance changes since 1997.

SOURCE: INFOLIANT, PITTSBURGH

At least one vendor believes the Infoliant analysis overstates the "moving target" problem. Although Dell appears second-highest on the Infoliant list, with 69 status changes, the PC maker has logged only one or two since August, according to David Cunningham, program manager for Year 2000.

Cunningham believes that customers can have a high degree of confidence that what they see now is what they'll get come Jan. 1, in terms of Dell products and those of other manufacturers.

"There are always going to be some status changes as far as the hardware goes, but most of those are reverting back to some of the older systems," Cunningham says. "Any of the new stuff that's coming out is certified, and I haven't seen much fluctuation in that at all." ◪

On the net without a net?

You need a firewall, an affordable, easy to use solution that has rock-solid **security**, supports all your Internet needs, and that you can **trust** to stay with you as the Internet grows and changes.

BorderWare has been providing this to thousands of users since the Internet explosion began.

Version 6 introduces new advanced features, better performance and **lower cost of ownership.**

Find out how BorderWare can be your safety net today. **Visit www.borderware.com**

BORDERWARE
Technologies Inc.

90 Burnhamthorpe Rd. West, Suite 1402, Mississauga, Ontario, Canada, L5B 3C3
Toll Free 1-877-814-7900

Free Product info enter NWInfoXpress #77 online @ **www.networkworld.com/infoxpress**

Introducing CallPilot - the latest in unified messaging technology from Nortel Networks™. CallPilot lets you manage e-mail, voice mail and fax messages with the mere click of your mouse, all from within your familiar e-mail interface.* You can even use our revolutionary speech recognition feature to manage your messages using simple voice commands. All this is made possible with a Unified Network from Nortel Networks, which enables you to integrate voice, video and data and create a communications solution that will serve your needs well into the future. For more information, **call 1-800-4 NORTEL**, or visit us at **www.nortelnetworks.com/16DY**

NORTEL NETWORKS™
How the world shares ideas.

CTI PRODUCT OF THE YEAR

Nortel Networks, CallPilot, Unified Networks, the Nortel Networks logo and "How the world shares ideas" are trademarks of Northern Telecom ©1999 Northern Telecom. All rights reserved. *CallPilot is compatible with MS Outlook, Lotus Notes, Netscape Messenger, Eudora Pro and other IMAP 4 compliant e-mail clients.

Free Product info enter NWInfoXpress #60 online @ **www.networkworld.com/infoxpress**

'Net Insider . Scott Bradner

WALKMAN OR BETAMAX?

Sony Corp. earlier this month uttered the magic word “network” to transform itself from a yesterday company into a tomorrow one.

Sony decided that it has to recreate itself to be ready for what it calls “the network-centric society of the 21st century.” It remains to be seen if this new Sony will follow the path of innovation that led to the Walkman or the path of obstinateness that produced the Betamax.

Sony has reorganized its electronics divisions into four new business units: Home Network Company; Personal IT Network Company; Core Technology and Network Company; and Sony Computer Entertainment. Seems that the company likes this network thing, considering that only the computer games group does not have the word network in its name.

Each of the business units will be largely autonomous, with local authority and separate research and development labs.

A major electronics company jumping on the digital network bandwagon is not all that special during these days of near-religious fervor over the idea of the convergence of voice, video and data via the Internet.

But Sony seems to be marching to a different drummer — one that may well be playing the original Internet tune.

As an article in the March 7 *New York Times* notes, Sony's biggest competition on its new path is Microsoft, which has defined local networking in corporate America.

In the past few years, many people have called Microsoft the “new IBM.” One part of IBM's old view of the world was that there would be only one computer of any importance in an organization — the IBM mainframe. In IBM's model, all other computers — if there were any — would be subservient to the mainframe.

Today's PCs are as powerful in most dimensions as the IBM mainframes of a few years ago, and Microsoft seems to have the same model in mind that IBM did. A computer running a Microsoft operating system, Windows or Windows CE, will be a mini-mainframe acting as the broker of services in the home.

This type of intermediary breaks the Internet model's most basic feature — applications reside in the edges. Simply running them enables new applications. In the IBM/Microsoft model, the controlling computer brings applications to you.

Sony is following the Internet path. The company describes a continuation of the Internet peer-to-peer model with dozens of network-based appliances communicating without help from a PC.

My heart rides with the big guy here — Sony's revenue is 3.5 times that of Microsoft — and with the Internet model that lets me plan my own future.

Disclaimer: Some say that Harvard is the big guy when it comes to well-deserved ego, but the above is my own heart riding.

Bradner is a consultant with Harvard University's University Information Systems. He can be reached at sob@harvard.edu.

THIS IS YOUR DATA.

THIS IS YOUR DATA IN OUR NEW DATACRYPTOR 2000.

RACAL'S DATACRYPTOR™ 2000

THE WORLD'S MOST ADVANCED TRIPLE-DES LINK ENCRYPTOR

The **DC2K** link encryptor is designed to protect valuable data on your network by providing secure communications across a private or public network.

When you compare the features of the **DC2K** to its competitors you'll see that no other link encryptor offers you the *benefits of strong security, choice of algorithms, SNMP manageability, and protection from obsolescence at any price.*

- Secure Data Communications
- DES, 3DES, SkipJack and Other Algorithms
- X.509 Certificate Based Public Key Management
- Compatible with SNMP Managers
- Secure Remote Configuration
- Electronically Loadable Algorithms, Including National and Custom Algorithms, Preventing Obsolescence
- Sealed Tamper-Evident Case with Two Zones of Physical Security
- Comprehensive Diagnostic Testing
- Secure Link Element Manager for Windows 95 and NT Using PPP
- Year 2000 Compliant
- Designed to Comply with FIPS 140-1 Level 3 and ITSEC Level E3

NOW take advantage of our

SPECIAL OFFER:

Turn in your existing encryptor and receive up to $1000 rebate toward the purchase of a new DC2K!

To find out more call:
1-888-744-4976 or 1-954-846-4700

Racal Security & Payments

LINK TO A SECURE FUTURE

RACAL

Racal, Racal Security & Payments and Datacryptor 2000 (DC2K) are trademarks of Racal Electronics Plc. ©1999 All rights reserved. 2/99 PBA-1824

Free Product info enter NWInfoXpress #64 online @ www.networkworld.com/infoxpress

Technology Update

Evolving Technologies and Standards

Ask Dr. Intranet

By Steve Blass

We've just installed an Apache Web server on our intranet using a new AIX 4.3.2 Unix server from IBM. But we can't find the online manual pages we expected to come with the new Unix system. We installed the complete base operating system twice but still haven't been able to access the "MAN" pages. Can you help?

Via the Internet

IBM is encouraging its customers to use a browser-based information manager rather than the traditional online manual pages. In other words, the standard MAN pages no longer load by default. In fact, IBM doesn't even include that online documentation with the base AIX 4.3.2 server. You have to order those pages.

If you do order the online pages, make sure to load the bos.docregister.fileset package before you install the pages. If you don't, you'll need a Web browser or the included IBM document-viewing facility to get to the system documentation.

Some people within the Unix community feel the abandonment of the standard MAN page facility in favor of the HTML version is a bad move on IBM's part. Not only has this particular function been a mainstay of many Unix system administrators, it also is an expected standard feature of the Unix operating system for anyone who does serious command-line interface work.

As a network architect at Sprint Paranet in Houston, Blass understands the strain of developing and managing intranets. Send your problems to dr.intranet@paranet.com.

Swiss mix boosts backbone convergence

BY ERIK EKLUND

Dynamic synchronous transfer mode (DTM) is a new broadband network technology that helps enterprise networks efficiently carry voice, data and streaming video on a single, integrated network.

Developed by the Swedish Royal Institute of Technology, Ericsson and other companies, DTM can automatically set up connections and assign a certain number of channels or bandwidth to each connection, depending on traffic type and bandwidth requirements — all with little or no delay.

Specifically, DTM divides fiber pipe capacity into frames of 125 microseconds, which are further divided into 64-bit slots. The number of slots per frame depends on the bit rate. For example, with a bit rate of 2.5G bit/sec, the number of slots is around 4,800. DTM uses a distributed algorithm for slot reallocation — the pool of capacity, or free slots, that is distributed among DTM nodes (see graphic).

DTM is similar to SONET technology in terms of low complexity and overhead, but DTM includes signaling and switching to increase the flexibility and avoid the hierarchical structure of SONET.

One can think of DTM as a next-generation SONET with switching features and flexible, configurable and on-demand bandwidth. Once established, a DTM channel provides guaranteed service, and, depending on the channel's traffic load, the capacity of the channel can be altered during operation. DTM also provides the means to log resource usage for billing, management and administrative purposes.

As a link-layer technology that works directly on fiber, DTM may be used on top of, or in parallel with, existing SONET infrastructures. While it was primarily developed to efficiently handle IP traffic, DTM's synchronous properties also allow it to carry legacy telephony and leased-line traffic effectively over the same infrastructure as IP and streaming video. DTM maintains full isolation between the different transmission streams and produces little overhead. These synchronous properties are more important today, as IP is also carrying more real-time applications.

DTM combines the reliability and guaranteed service of SONET, and the flexibility and traffic-engineering capabilities of ATM, but at a lower cost and with less complexity. It is designed to fully utilize the almost unlimited capacity of optical fiber by emphasizing simplicity and avoiding computation-intensive policing, queuing, buffering and control mechanisms.

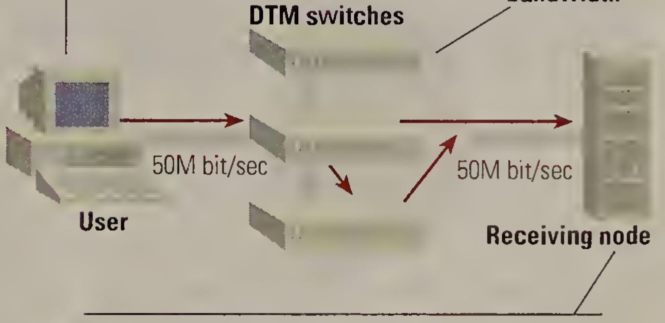
HOW IT WORKS

Dynamic synchronous transfer mode

DTM is a new technology for building broadband networks. At its core, DTM combines the advantages of circuit and packet switching. It lets enterprise network operators efficiently carry voice, data and video on a single, integrated network. Each DTM node in the network maintains a status table that contains information about free bandwidth in other nodes. When more bandwidth is needed a node consults its status table to decide which node to ask for more bandwidth.

❶ User makes a session request that requires 50M bit/sec of bandwidth.

❷ The DTM switch checks its available pool of bandwidth to see if it has enough to satisfy the request and, if it does, immediately establishes a connection. If the switch doesn't have enough of its own bandwidth available, it has to request more from other switches on the link.



❸ The receiving node notifies the sender that the requested capacity has been allocated and the transmission — voice, video or data — can then begin.

High logical connectivity is another advantage of DTM's multichannel interface and switching features; network nodes can easily be connected with nodes other than their physical neighbors. Together with DTM's ability to reallocate channel and on-demand bandwidth, this provides traffic-engineering capability equivalent to that of ATM networks.

DTM consolidates the number of layers between IP and fiber by combining transport, add-drop multiplexing and switching in a single box. The idea is to provide data-oriented transport and efficient and dynamic resource allocation for IP nets.

The protocol also works very well over a dense wavelength division multiplexing (DWDM) infrastructure, where DTM switches provide dynamic add-drop support between nodes sharing a wavelength, and switching of traffic between nodes situated on different wavelengths. DWDM uses light to transmit data.

Three start-ups are now designing, marketing and selling DTM products: Net Insight AB (www.netinsight.se), Dynarc AB (www.dynarc.se), and Effnet AB (www.effnet.se). All three are based in Sweden and have U.S. offices. Their products are interoperable on the physical and link level but not in terms of signaling. The goal is to make DTM products fully interoperable. An initiative to standardize DTM is before the European Telecommunications Standards Institute.

Toshiba and Net Insight are jointly developing a DTM chipset, integrating full switching and access features in a cascadable eight-port DTM chip with 8G bit/sec nonblocking capacity. It will be available for third-party vendors by year-end. The chipset will make products more cost-effective and will be licensed with DTM protocol software.

Several DTM networks are up and running. For example, VLT, the regional telephone and cable TV operator in Vasa, Finland, has been operating a DTM voice and data backbone since November. ICG Communications in Denver, as well as competitive local exchange carriers in Sweden, are testing DTM equipment.

Eklund is vice president of business development at high-speed network gear maker Net Insight in San Francisco. He can be reached at erik.eklund@netinsight.se.

Gearhead — inside the network machine . Mark Gibbs

QUESTIONS AND ANSWERS ON BEYOND COOL

There was such a huge response to my columns on e-mail HTML forms and JavaScript that a follow up is in order.

If you'll recall, on Feb. 8 I wrote about embedding HTML forms in e-mail messages ("A new form for forms," page 32). At the end of the column, I listed an e-mail address that would let intrepid souls try the forms. Most who accepted the invitation could read and interact with the forms, and invariably they asked, "How did you do that?"

Answer: Pretty easily. To create the form, I used Microsoft FrontPage and in normal view (WYSIWYG view), laid out the form. Still in the normal view, I selected the form and copied it to the clipboard. Then, in Microsoft Outlook, I pasted the form into the body of an HTML message. That part is crucial — you have to paste the form into an HTML message.

It is also important to note you can only create HTML content in this way when you copy a form from a program that creates HTML forms and marks the clipboard as containing HTML content (for example, Microsoft FrontPage and Word). To make things a bit more complicated, the program you paste into must recognize and handle the clipboard format (Microsoft Outlook).

Readers acknowledge some common problems. Some tried to paste a form into a non-HTML message or into an e-mail client that didn't understand HTML clipboard content. Another recurring problem was trying to copy the form from a program that placed the HTML data on the clipboard as plain text.

Now, jumping over to the March 8 column on JavaScript ("Oh, the simple joys of JavaScript," page 38), I must admit that we had an error creep in. The result was a flood of questions along the lines of "Why doesn't this work?"

Answer: The code to mask the JavaScript from the non-JavaScript aware browsers must start with: "<!-- Begin" and close with: "// End -->".

So how about combining HTML forms with JavaScript? This works splendidly using Outlook with Internet Explorer 4.0.

The way to do it is create an HTML page (with or without a form) with whatever JavaScript functionality you need and send that as your message. That's it. It allows you to send messages that include cool features such as real-time clocks, slideshows or interactive spreadsheets. We'll leave that as an exercise for you, but send me any good forms you develop.

While we're talking cool, another interesting use of JavaScript is bookmarklets. The idea, first proposed by Netscape, is quite elegant. But to understand bookmarklets we need to review URLs. When you save a bookmark, what you are really doing is saving a URL, the specification of the protocol to be used followed by a domain name followed optionally by a path and other stuff we'll ignore.

An example of a URL is "www.gibbs.com/gearhead." Now you know the protocol here, good old HTTP. And you probably know the protocol could be FTP:, news: and so on. What you may not know is that there is a protocol named "javascript:" that is the basis of bookmarklets.

For example, if you tell Internet Explorer 4.0 to go to the URL "javascript:resizeTo(640,460)," guess what happens? You resize the browser window to VGA screen size — extremely useful when you're proofing Web pages.

Note that the windowing functions are only available under 4.0+ browsers and, as with quite a few JavaScript functions, you have to be aware of browser dependencies.

Question: What happens if we save the javascript: URLs as bookmarks? Answer: We can execute them whenever we need to.

Conclusion: Beyond cool. And as you can save up to around 500 characters in a bookmarklet, you have enough room to code some reasonably serious things. Check out the site www.bookmarklets.com for one of the best collections.

Questions and answers to gearhead@gibbs.com.

NetworkWorld Fusion

Spotlight

News, tips and tools from our Web site

Brrr . . .

How would you advise a 40-something government worker at a research center in Antarctica on how to break into networking? That's a question Career Doctor Shaun Kelly answered last week. Other questions included what sort of bonus to demand for fixing Y2K problems to how many devices the average network manager should be expected to oversee.

DocFinder: 2032

Novell, give it away

Last week, *Network World* Associate News Editor Michael Cooney said Novell should give away Novell Directory Services (NDS) for NT as a way of fending off Microsoft's (still unreleased) Active Directory. A number of Fusion users agreed. "I would like to see a stripped-down NetWare version with NDS for NT given away free," wrote one.

What do you think? We've set up an insta-vote for you to register your snap opinion, after which you can dive into our NetWare forum to further discuss the question.

DocFinder: 2132

New forum software

We installed a new version of Lundeen & Associates' Web Crossing forum software last week. There are some subtle, but still cool, features.

For example, you can now get a threaded view of a discussion (click on the little triangle next to a discussion while in a conference, or on the "Threaded" button while in a discussion). You'll get a listing of each message's topic (and the name of the poster), which can be handy in a forum with a lot of posts (such as, oh, the NetWare discussion mentioned above).

Each discussion now has an "All" button, which lets you get all of the discussion's messages on a single page, which is useful for printing or saving to your hard drive.

Click on the "Forums" button on any page.

Download of the week

Iona Technologies, the Irish lads best known for their object request broker, have jumped on the Enterprise JavaBean (EJB) bandwagon with the beta release of HomeBase.

HomeBase includes tools to customize and control the generation of EJB code. Version 0.5, code-named "Scunthorpe," contains a relational database adapter and graphical user interface for creating Beans from database schema. Future releases will add more adapters and tools. HomeBase uses Extensible Markup Language as a means of providing performance analysis and management information. Free from Iona, HomeBase is available for any Java-enabled platform.

Download it and other JavaBeans tools at:

DocFinder: 2133

No coffee?

Early returns are in from our first-ever You survey (in which we try to determine exactly who are today's network professionals). A surprising number of you say you don't drink any coffee (should we be asking about Jolt or hard liquor?). And your ideal job would be at Cisco, Microsoft or Novell. Get more results and take our survey at:

DocFinder: 2029

UPS and you

Help Desk columnist Ron Nutter this week answers: How many file servers can one uninterruptible power supply system support?

DocFinder: 2134

www.nwfusion.com

UP TO $200 REBATE*
www.genicom.com/rebate.htm

ONE FOR ALL.

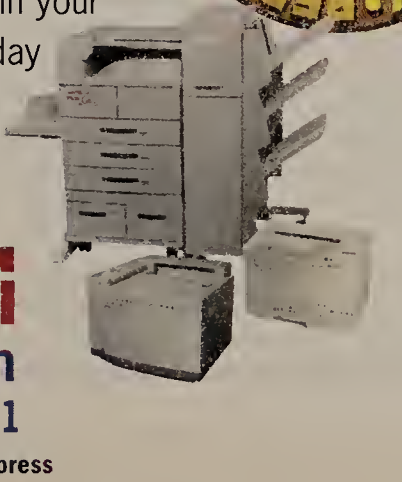
microLaser™ 320N with Intelliprint® Controller Architecture

Print Speed: Up to 32 pages per minute
Resolution: 1200 x 1200 dpi
Duty Cycle: Up to 150,000 pages per month
Processor: 133MHz RISC
Memory: 32MB, expandable to 96MB
Languages: Adobe® PostScript® 3, PCL® 5e emulation with PJL
Std. Interfaces: Ethernet 10/100BaseT and 10Base2, IEEE 1284 parallel
Paper Input: 1,050 sheets std. with automatic collating; 3,550 maximum; up to 11" x 17"

THE ONE PRINTER FOR YOUR ENTIRE DEPARTMENT. NETWORK READY!

It's the first in a new generation of network printers: GENICOM's microLaser 320N. Powered by our exclusive Intelliprint controller architecture, the microLaser 320N brings you a superior combination of print speed and resolution — up to 32 ppm at *true* 1200 x 1200 dpi. The microLaser 320N includes Adobe PostScript 3 for faster image processing, increased font capacity, and photo-quality graphics! With standard collating/offsetting, remote web-based printer management, and optional finisher/stapler and 10-bin mailbox, the microLaser 320N is versatile enough for everyone in your department. Call GENICOM today and mention "one for all" to receive a free gift.

PERFORMANCE • VALUE • DURABILITY • GENICOM NETWORK PRINTERS



Adobe® PostScript® 3™ Intelliprint Technology

GENICOM®
www.genicom.com
1-800-GENICOM, Option 1,1

*microLaser 170 and microLaser 320N: purchase before May 31, 1999. Copyright © 1999 GENICOM Corporation. GENICOM, microLaser and Intelliprint are registered trademarks of GENICOM Corporation. Adobe, PostScript 3, and the PostScript logo are trademarks of Adobe Systems Incorporated. All other product names are trademarks of their respective owners. One gift per person, while supply lasts.

Free Product info enter NWInfoXpress #57 online @ **www.networkworld.com/infoxpress**

Editorial Insights

Attack of the lame start-ups

It used to be that every software company worth its salt was gunning for Microsoft. Of course, that strategy was about as smart as pole-vaulting in a thunderstorm wearing metal underwear. But at least these guys had ambition.

The image of today's entrepreneurs makes them sound pretty wild: Young smart hotshots willing to work all night, risking everything to make it big. I disagree. Most are just plain wimps, at least compared to the old crew. To some this is blasphemy, heresy, an attack on the sacred cult of the start-up. I would ask those critics if they have ever talked with any of today's start-ups.

I have. Here's how it usually goes:

"We have this neat e-commerce solution that uses Extensible Markup Language and is aimed at Subsector D of our nation's health care infrastructure."

"Hmmm. Fascinating. I am wondering if you are interested in broadening out at all to become a provider of a fuller range of software products."

"Well, we really see a tremendous opportunity in Subsector D. Once we have fully grown that market, we may look at Subsector F."

Whoa, Evel, you are scaring me with that daredevil attitude!

These start-ups simply want to find a niche, mine it and either cash in through an initial public offering or get bought by a much larger company. None of them, however, wants to be the larger company.

I think this narrow-minded strategy is doomed. Look at the way people buy things. We don't drive to a tuna fish store; we go to a supermarket. And we don't like going to a small vendor to buy a piece of hardware or software that doesn't work with anything else. We prefer a full-service outfit that can sell us part of a system. That's why the yuppies at Cisco and Microsoft are eating brie, building wine cellars and driving overpriced European automobiles. Their stuff can basically stink, but it will sell well because it is part of a system.

If a start-up had any smarts, it would not ask for a paltry $5 million from the latest Doerr, New Venture, Battery, Alsop, Cagney & Lacey . . . fund. It would seek 20 times that to build a system of some sort, such as an entirely new approach to software, a whole new line of network gear that will drop Cisco on its head. Now that would be interesting.

— Doug Barney
dbarney@nww.com

Message Queue

A MODEST PROPOSAL

As the parent of three children, I read your 'Net Buzz item "Typos happen . . . " (March 1, page 62) with interest and dismay. Why not just give all the sex sites their own domain: .sex? That would make it easy for those wanting it to find it, those not wanting it to avoid it, and parents to block it.

Richard Mann
Systems administrator
Publication Services, Inc.
Champaign, Ill.

ACHTUNG, BABY

I agree wholeheartedly with Dave Kearns that we need far more government regulation in the computer industry if the U.S. is to remain a world power in high tech ("The help we really need," March 1, page 17). In fact, I think Kearns didn't go far enough. I have five suggestions for further regulations:

- Have the government create an agency, similar to the Food and Drug Administration, that would decide if a particular piece of computer hardware or software was safe and effective. This agency would decide which products could and could not compete in the marketplace.
- Have the Federal Bureau of Investigation station an FBI agent in every office, meeting room and server room in every computer company in the country. That way nobody could do anything the government considers unethical and illegal, and we wouldn't have these annoying antitrust trials with IBM, Microsoft and other companies.
- Make it so that the standard product warranty states that the customer's inability to use the software or hardware would be grounds for a lawsuit. Also, it would have to be a felony to fail to provide free training for any computer product sold to any person or company.
- All Year 2000 bug fixes and/or enhancements would have to be provided free of charge and by Oct. 1, 1999, or the penalty would be death to the board of directors and all company officers.
- The social security number of every person working in the computer industry would have to be tattooed onto his or her arm, similar to what happened in the Nazi death camps.

I am sure that my recommendations would go a long way toward making Kearns' (and my) vision of the 21st century marketplace a reality.

Seth Allen
Alexandria, Va.

FIGHT, THEN SWITCH

Mark Gibbs' Backspin column "Ranting, raving and chasing bills" (March 1, page 62) definitely struck a chord with me. I had a similar experience with my cellular phone long-distance service.

I received a bill from MCI WorldCom that included a $3 minimum service charge. I called MCI WorldCom, and after being on hold for 15 minutes, spoke to a service representative who was not able to answer my question: What service was rendered to me by MCI WorldCom that entitled the company to charge me $3? After attempting to speak to the service representative's supervisor, I was disconnected.

I called MCI WorldCom again, waited on hold for 20 minutes, and spoke to a service representative who had a great deal more knowledge than the first one. I asked, "Is this $3 charge simply for having the privilege of listing MCI WorldCom as my long-distance carrier on my cellular phone account?"

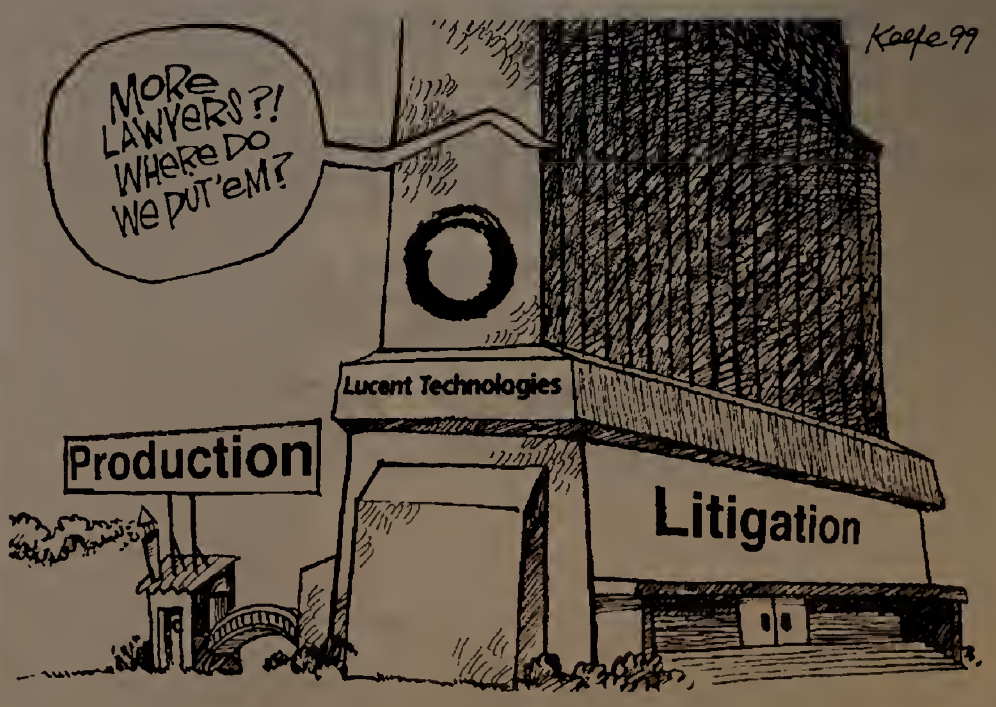
The representative answered, "It is for having the long-distance equipment available for your use should you make a long-distance call on your cellular phone. If you do not want to pay this minimum service charge, you are welcome to cancel your service with MCI WorldCom." I did.

I then contacted my cellular phone service company, which informed me that, yes, they did offer long-distance service to their subscribers, and, no, they did not charge a minimum service fee. I switched.

Lee Cretin
System administrator
Diablo Timber
Napa, Calif.

Send letters to nwnews@nww.com or John Gallant, editor in chief, Network World, *161 Worcester Road, Framingham, MA 01701. Please include phone number and address for verification.*

More
Online
More le[illegible]vice charge[illegible]opics.
DocFinder
FIND IT → 2124 ON FUSION



Management Mode . Jeff Shapiro

IF YOU HAVEN'T UPGRADED YET, WAIT FOR WINDOWS 2000

Here we go again. Microsoft, having thoroughly confused us with its various versions of Windows, now is adding Windows 2000 to the mix.

Windows 2000 Professional, previously known as Windows NT Workstation 5.0, will become Microsoft's "mainstream desktop operating system for businesses of all sizes," the company's press release states. It is expected to ship this year, and as a network manager, you will once again face that timeless question: to upgrade or not to upgrade?

If your enterprise is like mine, it's heterogeneous in the extreme. You might still have a few DOS-only machines and Windows 3.1 computers running legacy 16-bit applications. Windows 95 is on most desktops, Windows NT is on a few and your laptops are all running Windows 98 for the power management and Universal Serial Bus (USB) support. Supporting an additional operating system is completely out of the question, so what are you going to do?

It's time for a major desktop simplification project. First, say goodbye to DOS. Retire those machines in favor of newer ones with Windows 95, and tweak the environment until those old DOS programs run or replace them with programs that will. Next, put the Windows 3.1 gang on notice that they're going to Windows 95, and tweak and tweak again until the programs either work or are thrown out. Those pre-Windows 95 computers are probably a Year 2000 risk anyway, which is a good excuse for finally pulling the plug.

The next step is deciding what to do with all those Windows 95 machines. My recommendation: Forget about an incremental upgrade from Windows 95 to 98 to 2000. Why go through all the headaches of a major upgrade and the associated training cycle, only to have to do it all over again in a year?

In my organization, Windows 98 has been a pain in the butt. It's only marginally better than Windows 95 with the appropriate service and support packs installed, and yet it's different enough, especially with regard to network setup and drivers, to be difficult to support. What we really want is a single desktop across the enterprise, just like in the good old days.

Windows 2000 looks like it's going to be the path to get us there. Windows NT Workstation won't cut it, largely due to the lack of USB support. Windows 2000 will be the first fully functional operating system that's good enough and different enough to warrant a top-to-bottom switch.

It certainly won't hurt that Windows 2000 will be the first version that incorporates features from the 95, 98 and NT environments, easing transition paths. More importantly, Windows 2000 will have the management and configuration capabilities we really need for effective support.

If you've already upgraded your enterprise to Windows 98, there's nothing wrong with your decision. It's a good operating system, and the needed patches and drivers are already included when you install it. But for the rest of us, slightly better just ain't good enough.

Shapiro is district technology coordinator for the Kingsport City Schools in Kingsport, Tenn. He can be reached at jshapiro@kpt.k12.tn.us.

On Security . Winn Schwartau

Y2K PROBLEM OR HACKER ATTACK? BE PREPARED FOR BOTH

No one really knows how much damage will be inflicted on our way of life when we enter the year 2000. Will food deliveries to supermarkets be halted because diesel trucks can't prime their two-digit-date oil pumps? Will the elderly and the poor freeze to death in the concrete tundra of the northern U.S. as power plants go quiet? Will divide-by-zero in COBOL-driven Ukranian missile silos trigger an erroneous nuclear launch?

Perhaps closer to home for *Network World* readers, will the two-digit date change cause corporatewide confusion, regional-office chaos, customer exodus, government intervention and trillion-dollar lawsuits?

Actually, none of that worries me all that much. What I find particularly intriguing is a simple conundrum: Come January 2000, how will we be able to tell the difference between a legitimate security event and primary or corollary Y2K damage?

Large organizations with high profiles and major economic responsibility have to prepare for the added complexity of determining whether a post-010100 security event is a real attack or a Y2K glitch that gives the appearance of a security violation.

Say on Monday, Jan. 3, 2000, you get an indication that a hacker is trying to break into your networks. How do you react? What if the detection system says a hundred hackers are trying to break in? Do you respond in the same way . . . or do you automatically dismiss it as a Y2K thing — nothing to worry about?

YÜCEL

What about the next Monday, Jan. 10, 2000? Do you let your Y2K guard down or not? And the week and month after that? At what point can you predetermine if a security violation is real or just another Y2K glitch that is bound to recur for several months until all systems have been completely updated?

There is credible suspicion that ne'er-do-wells will use Y2K to mask other behavior. The Pentagon and intelligence services have stated that there is a low-to-medium probability of international terrorists attempting to launch significant attacks against U.S. (or other) critical infrastructures. Their motivation? To disrupt society. Many professionals believe strongly that malicious hacker-types will try to wage attacks against companies. Why? Because they think it's funny and can hide their actions behind Y2K.

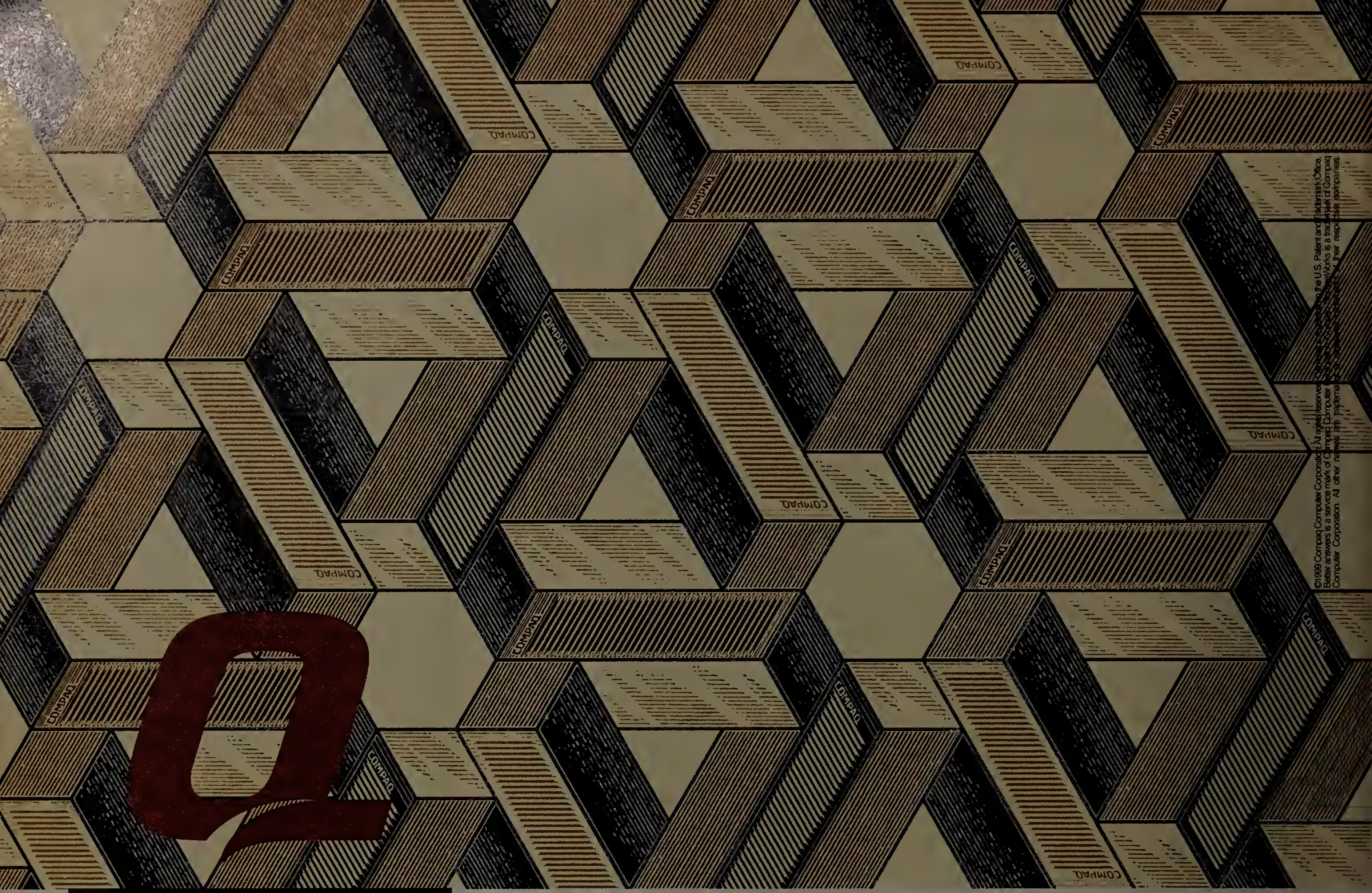
This is not to say that your company is automatically a target, so don't jump to that conclusion. What this means is that companies must increase their security vigilance and become even more sensitive to security-relevant events. A few thoughts on preparing for this situation:

- Make your employees acutely aware that the bad guys might try to use Y2K as camouflage for other nasty deeds, such as theft, maliciousness, infrastructure attacks and to promote their religious and political beliefs.
- Set policy. Under the premise that increased attacks might occur, you may want to set a higher degree of sensitivity on your access-control mechanisms. You may also want to restrict certain behaviors, especially with regard to the Internet, until you feel your security posture is stable.
- Be aware that viruses are getting nastier and nastier. Make sure you have the latest signature files on your computers. Expect a host of viruses to be unleashed at the end of 1999. Trojan Horses, such as Back Orifice, are being improved and can steal your confidential data without your knowledge. You may want to restrict or monitor e-mail attachments more closely than you do normally.
- If your computers behave oddly (or more oddly than usual), have your staff view such behavior as a security-related event that should be reported to management immediately.

Security is critically important to all companies, but assumptions are anathema to security professionals' performing their mission. Instead of assuming that events are related to Y2K or hacker attacks, plan for both, work on means to identify the real culprit and have potential solutions in mind.

Better safe than sorry.

Schwartau is chief operating officer at The Security Experts, an information security consulting firm in Seminole, Fla., and president of InfoWar.Com. He can be reached at winn@securityexperts.com or winn@infowar.com.



Can a storage system work so flawlessly, it's practically invisible?

Decidedly, yes. At Compaq, we believe a storage system should be so simple and flexible, you hardly even notice it. That's why Compaq StorageWorks™ manages data across multiple platforms. Seamlessly turning your stored data into a flexible resource throughout your enterprise. All while being centrally managed from one location. That's because our standards-based architecture provides the high availability and robustness you need to handle data throughout your enterprise. To find out how our invisible storage solution can visibly improve the way you manage data, contact 1-800-STORWORK or www.compaq.com/yourdata.

COMPAQ Better answers.℠

©1999 Compaq Computer Corporation. All rights reserved. Compaq registered in the U.S. Patent and Trademark Office. Better answers is a service mark of Compaq Computer Corporation. StorageWorks is a trademark of Compaq Computer Corporation. All other names are the trademarks of their respective companies.

AT&T'S BIG FIX

Continued from page 1

Joe Lueckenhoff, AT&T's vice president of Data Network Services, remembers April 13 vividly. A few minutes before 3 p.m., while he was at the company's Bridgewater, N.J., offices to meet with his boss, Tim Murray, his beeper went off.

Lueckenhoff, a 20-year AT&T veteran, was being paged by AT&T's Frame Relay Network Operations Center in nearby Parsippany, N.J. "We have a network operations center that actively monitors all the switches in the network," he explains. "They saw alarms going off on the trunk side and declared a network emergency."

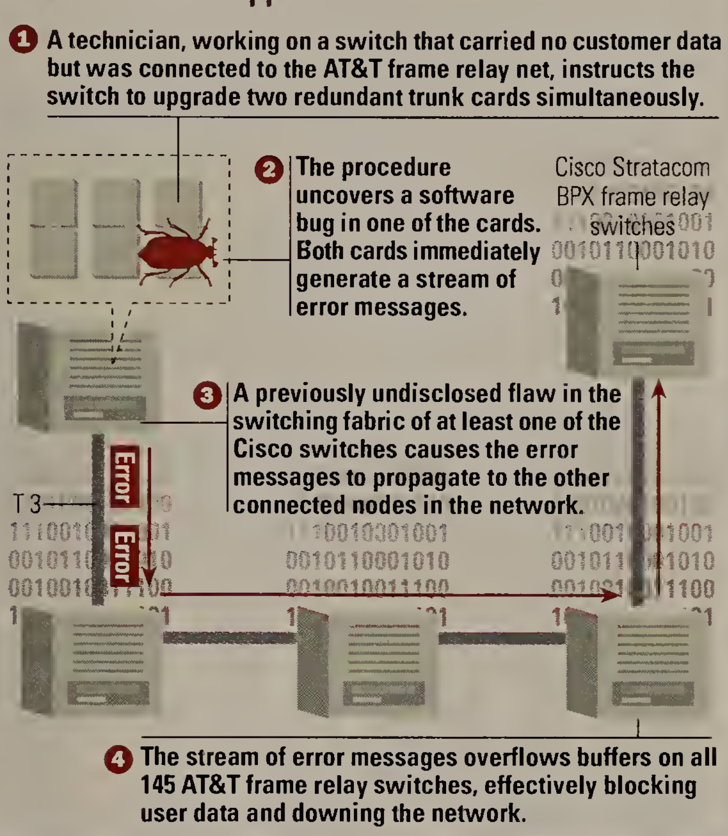
At the time Lueckenhoff was being paged, dozens of other company technicians and managers were also being beeped by the operations center. AT&T has long had what it calls a "Red Book," which enumerates the methods and procedures for dealing with a network emergency. The company drills and trains for these situations in practice scenarios, but as Lueckenhoff and others soon learned, this was no drill.

One procedure calls for the network operations center to set up bridges, or conference calls. In the worst-case scenario, three bridges are established: one for a dozen or so key AT&T managers, another for technical personnel and a third for customer-care and sales people who are charged with alerting business customers of a major outage. This was, without question, a worst-case scenario.

An all-nighter

Throughout the rest of the afternoon and on through the night, AT&T managers and technicians manned the various bridges while emergency teams frantically sought to resolve the problem and determine its cause. The only thing that was known for sure was that at 2:30 p.m. a technician had undertaken a procedure to upgrade trunk cards on a Cisco Stratacom BPX frame relay switch and something had gone drastically wrong; the switch began producing a stream of error messages (see graphic). Even though the switch didn't have customer traffic on it, it was connected to the network and, therefore, was active. Mistakenly, the technician had assumed the switch was on standby. AT&T knew about the procedure right away because the technician had logged in what he was doing.

How the crash happened



❶ A technician, working on a switch that carried no customer data but was connected to the AT&T frame relay net, instructs the switch to upgrade two redundant trunk cards simultaneously.

❷ The procedure uncovers a software bug in one of the cards. Both cards immediately generate a stream of error messages.

❸ A previously undisclosed flaw in the switching fabric of at least one of the Cisco switches causes the error messages to propagate to the other connected nodes in the network.

❹ The stream of error messages overflows buffers on all 145 AT&T frame relay switches, effectively blocking user data and downing the network.

By 11 p.m. an emergency team had separated the individual network elements — the switches and routers — so the company could isolate the propagation of error messages should it reoccur. Soon AT&T had determined which switch and trunk condition had caused the problem. The company also began rebuilding the various subnetworks that together comprise the network, ensuring that each was healthy. As individual subnetworks got increasingly robust, AT&T connected them to one another. "When you're building subnetworks, customers on Subnetwork A can't talk to customers on Subnetwork B, and frankly, connecting the various subnetworks is what took so long to get the network re-created," Lueckenhoff explains.

By 8 a.m. the next morning, all the subnetworks were connected, and AT&T started bringing customer traffic back online. An hour later about 90% of customer traffic was up, but a number of permanent virtual circuits (PVC) used by some of AT&T's biggest customers were proving troublesome to restore. "There were some unique PVCs that took the rest of the morning to get up and working," Lueckenhoff says. "By 2:30 on the afternoon of April 14, 99.9% of the PVCs were up."

Throughout the day, Lueckenhoff and Frank Ianna, AT&T executive vice president, and president of AT&T's network unit, repeatedly briefed AT&T CEO C. Michael Armstrong, as well as Cisco CEO John Chambers, regarding AT&T's progress in restoring service. "I was personally talking to Mr. Chambers on the 14th as well as the following day," Lueckenhoff recalls. "He was very interested in making sure our customers were happy and up and working. Cisco was very cooperative in this."

As for Armstrong, this was his first real crisis in the CEO post, having come over from Hughes Electronics just a few months prior. "He had experience in this because we were talking about a computer problem basically, and he came out of the computer industry," Lueckenhoff says. "He clearly understood what was going on."

Unlike his predecessor, Robert Allen, a remote, seemingly imperious executive who came out of the analog side of the company, Armstrong was actively showing his support for the data services operations by manning the battle lines with Ianna and his troops during the crisis.

At a press briefing on the morning of April 14, Armstrong said he believed a software problem started in two Cisco Stratacom BPX frame relay switches, propagating itself in about 145 nodes throughout the network. He conceded, however, that AT&T still hadn't pinpointed the root of the problem.

Armstrong also announced that AT&T would not charge any of its frame relay customers for service until the problem was fully repaired, a pronouncement that would prove more costly than the CEO may have realized at the time.

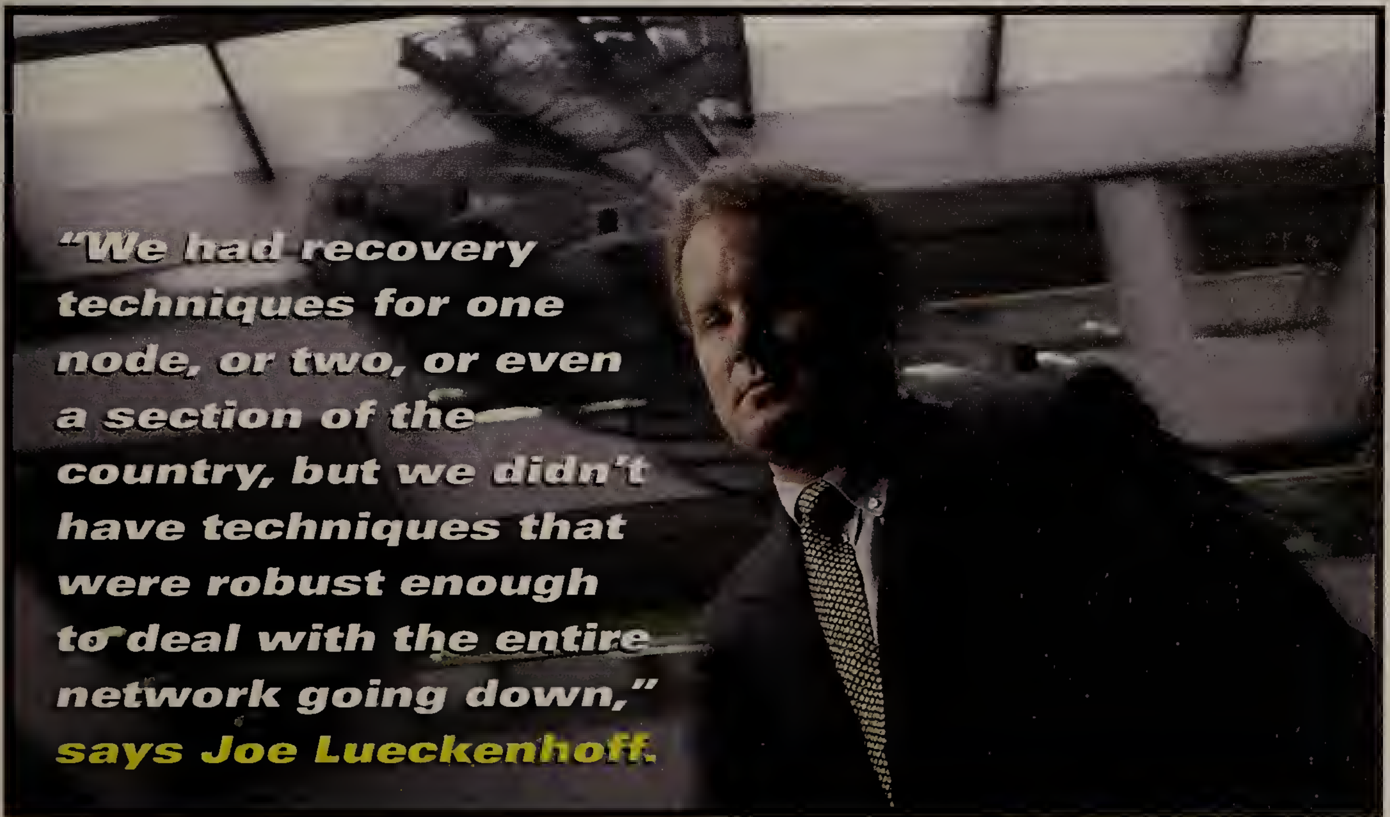
Uncovering the cause

For the next eight days, AT&T set about trying to determine what triggered the outage and to mend fences with its angry customers. Within 48 hours of the network going down, Armstrong had written letters to the CEOs of the customer companies apologizing profusely and explaining what was happening.

Meanwhile, a crisis team gradually put together the pieces of the puzzle behind the network crash.

With AT&T's automated upgrade procedure, there are two ways to upgrade pairs of redundant trunk cards, one of which is active while the other is on standby.

With one approach, an engineer orders the switch's network operating system to upgrade the standby card exclusively. Once that process is complete — and it's clear the newly upgraded card is stable — the active card is put on standby, and the just-upgraded card goes active. Then, and only then, is the



"We had recovery techniques for one node, or two, or even a section of the country, but we didn't have techniques that were robust enough to deal with the entire network going down," says Joe Lueckenhoff.

STEVE SKOLL

second card upgraded.

With this sequential approach, if there is a flaw in one of the cards, it is isolated during the upgrade. "Had we done that, the problem never would have happened," Lueckenhoff says.

Instead, the technician used a second approach. Assuming that the trunk cards were isolated from the network because the switch to which they were connected wasn't carrying traffic, the technician upgraded both cards in one procedure. As it happened, there were flaws in the firmware of both cards, but the automated procedure upgraded the standby card and the active card so quickly that safeguards failed to kick in. "Normally, the system would have checked to see if there were alarms coming from the backup card, but it didn't," Lueckenhoff says. As a result, even though both cards were flawed, the upgrade procedure wasn't aborted. When system safeguards belatedly uncovered the flaws, the trunk cards immediately sent a stream of error messages back to the switch.

The exposure of the error in the trunk cards, coupled with another previously undisclosed flaw in the switching fabric of at least one of the Cisco switches, caused error messages to propagate to the other connected nodes in the network.

"What happened is that the stream of messages triggered by the errors filled up the buffers on all the switches connected to the network," Lueckenhoff explains. The overload effectively caused the switches to shut down, putting the network out of commission — all within a matter of a few seconds.

Frank Ianna helped keep CEO Armstrong updated during the crisis and had his team working with Cisco engineers for a month to repair a switching fabric problem.

The big fix

The kinds of problems that triggered the outage are certainly not unique to AT&T. "Any other carrier could experience a situation of this kind," notes David Goodtree, group director of Forrester Research in Cambridge, Mass.

Moreover, once the errors were uncovered, they were readily addressed. AT&T permanently shelved the upgrade procedure that triggered the breakdown. "The last time we ever did that procedure was on April 13," a company spokesperson says.

AT&T and Cisco also fixed and changed the flawed trunk cards by the end of April. Finally, Ianna's team and Cisco's lab people repaired the switching fabric problem, though that process wasn't complete until mid-May, a month after the network went down.

The repairs didn't end there, however. The outage and the ensuing restoration efforts exposed some fundamental flaws in AT&T's network. "Part of the problem was that we had recovery techniques for one node, or two, or even a section of the country, but we didn't have techniques that were robust enough to deal with the entire network going down," Lueckenhoff concedes.

Nor was there a fully operational out-of-band network in place to carry network management traffic; the message stream that actually caused the switches to go down was made up of management messages. And finally, AT&T didn't have sufficient planning, testing and simulation capabilities to deal with the entire network. "We had a test bed in place that would mimic about 20 nodes, and our network is much larger than that," Lueckenhoff says. He adds that while AT&T had contingency plans in place for a partial outage, inconceivably, there wasn't a comprehensive plan for a total network failure.

> ■ ***While AT&T had contingency plans in place for a partial outage, inconceivably, there wasn't a comprehensive plan for a total network failure.***

Once AT&T took stock of its network's flaws, the company launched an ambitious effort to enhance reliability — what it calls a four-dimensional technical blueprint — that is now largely complete.

Specifically, the carrier incorporated explicit overload controls for message streaming and has restricted the ways in which switches can reset themselves, as happened in the outage. AT&T also installed a recovery technique that Lueckenhoff claims is sufficient to handle the entire network and restore it in less than an hour should another outage occur. "Now we have a preplanned recovery procedure for an entire network outage," he says. "To tell you the truth, the procedures for a total network failure took too long to implement."

AT&T's new blueprint calls for an expanded testing environment and improved network management capabilities. "We now have a test bed in place that will actually mimic the size of the network we have in place," Lueckenhoff says. He declined to provide greater detail on the operational aspects of the new simulation and emulation techniques.

With implementation of a fully operational out-of-band network, management messages are now isolated from customer traffic, and network monitoring features have been upgraded. "We had trunk and switch monitors that notified us whether the trunk was up or down or had an alarm, but now we can actually monitor what the volume of the traffic in the message network is and whether it is approaching any thresholds that might indicate problems," Lueckenhoff says.

Finally, in the process improvements area, AT&T engineers and supervisors have been instructed to treat all network components as live. "Even if a switch doesn't have customer traffic on it, we assume that it does when we perform a routine," Lueckenhoff says. The company also requires technicians to answer a series of questions before they undertake any activity on the network. Explains Lueckenhoff: "These are questions such as, 'Do you know what to do in case of a problem? Do you know what the recovery techniques are in case a situation occurs?' "

Repercussions

Such improvements are positive fallout, but they don't change the fact that AT&T was badly damaged by the outage in several regards. "For one thing the money it gave back to clients was substantial," notes Christine Heckart, an analyst at the TeleChoice consultancy in Boston. Armstrong's offer not to charge customers from the time of the outage until the problem was fully resolved — April 13 through the first week in May — ultimately meant the company lost almost one-twelfth of the estimated $1 billion its data services business generates annually, a significant setback for an organization that was under considerable financial pressure at the time.

In addition, AT&T lost customers after the outage, including a business-consulting firm in St. Paul, Minn., J. Hill Group. AT&T claims, however, that fewer than 10 customers defected, many for reasons that had nothing to do with the outage. "A lot of customers had outstanding bids and contracts they were regarding before this ever happened," Lueckenhoff says.

Another negative: Over the past year, the outage has also become emblematic of the ultimate network disaster. "It continues to be kept alive by the press and to serve as fodder for reporters," Heckart notes.

On the other hand, AT&T generated quite a bit of goodwill in the way it responded to the outage. "I think Armstrong handled the situation extremely well and got a lot of points for his forthrightness about the problem," says Rosemary Cochran, a principal with Vertical Systems Group, a consultancy in Dedham, Mass.

"We rely on carriers like AT&T to bulletproof the network so we don't experience these problems," says one customer, Virgil Palmer, director of telecommunications and networks at Air Products and Chemicals in Allentown, Pa. "But anything manufactured by humans is going to break, so it's just a matter of when, not if, it's going to happen. AT&T was trying its best to recover from a bad situation."

TeleChoice's Heckart notes that under the terms of service-level agreements AT&T had signed off on a few months before the outage, the company was only legally responsible for providing free service during the crisis to a relatively small number of customers. "Armstrong went above and beyond what AT&T was required to do in this regard," Heckart says.

For customers such as Palmer, however, the free service was simply a token gesture. "They gave us the credit, but I would rather have had the service and not had to hassle with all the problems," he says.

Long-term, the outage served as a wake-up call to AT&T, which over the past year has poured substantial funds into overhauling its network and beefing up its data services research and development and technical force, all to safeguard its frame relay service. "We've implemented our technical blueprint, and we're confident that this type of outage will never happen again with our network," Lueckenhoff says.

McCartney is an editor and writer in New York. He can be reached at LatonM@aol.com.

More Online
Our inside look at the role key AT&T executives played in resolving the outage crisis.
FIND IT
2125
www.nwfusion.com

connectivity // data/internet/voice // wireless // applications // innovation // seamless integration

Does your network?

www.net.working.att.com

If not, click here.

Everyone
and
everything
working
together
in a whole
new way.
To make
your
business
succeed.

AT&T net.working℠

AT&T

© 1999 AT&T

You can't build skyscrapers out of hype. The same goes for networks.

We're from Pittsburgh. A city that made its reputation by producing the steel that countless skyscrapers, railroads and businesses were built with. Steel that was strong. Dependable. And made to last.

Hype didn't count. There was simply too much at stake.

Today, businesses are built on computer and communications networks. Networks that link multinational corporations. That run critical software applications. That can make the difference between being a leader and being an also-ran. Or worse.

All of which explains why more than 4000 companies around the world use networks from FORE Systems.

A FORE Systems network isn't made from hype, or vaporware, or promises. It simply works.

It can handle anything your company throws at it, without going down. Now, and into the future.

It lets your organization do more, do it faster, and do it better.

And it's built to last. Giving you a communications infrastructure that really is an infrastructure, instead of one you have to rip out and replace every few years.

But then, what would you expect from a company from Pittsburgh?

FORE SYSTEMS

Networks of Steel™

www.fore.com

1.800.320.9745

Free Product info enter NWInfoXpress #70 online @ www.networkworld.com/infoxpress

PREPARED TO BE PROACTIVE

BY NEAL WEINBERG

Ron O'Meara wants to put the network management team at NationsBank out of business. And NationsBank hopes he succeeds.

O'Meara, manager of the Performance Engineering Department at NationsBank, now part of Bank of America, leads an eight-person unit in Richmond, Va., dedicated solely to performance management — the art of avoiding network problems before they occur. The key to this art, he says, is using tools that measure application performance from an end-user perspective.

The way O'Meara describes it, network management is fundamentally reactive: "Somebody has to sit there and watch the icons turn red and blue and do something about it when they do." Performance management, on the other hand, is proactive. "You collect data about your network so you can predict what it's going to look like tomorrow. Then you can engineer away a lot of situations that make those icons turn red or blue," he says.

O'Meara uses a product called Pegasus from Ganymede Software to set threshold-based traps on key parts of NationsBank's 22-state network. Lightweight agents on desktops, servers and other network devices enable Pegasus to determine baseline performance. For example, Pegasus may find that, on average, response time is three seconds when a user in a bank branch is accessing a remote Lotus Notes server. In that case, O'Meara might guarantee the branch that response time will be no worse than five seconds. He will then set the trap at four seconds, so if response time begins to slip, he will be notified and will hopefully be able to address the problem before end users even notice.

More Online

FIND IT
DocFinder
2123
ON FUSION

- White papers on performance management from vendors including FirstSense, INSoft (formerly VitalSigns Software), NextPoint Networks, Proactive Networks and Jyra Research.
- Links to vendor sites for more product information.

www.nwfusion.com

That's the goal, but analysts say performance management tools still have a way to go before they deliver on their promises. For one thing, the tools may tell you that Lotus Notes' response time is heading south, but they won't likely tell you why. The best you'll probably get is an indication of whether the problem is with the client, the server or the network.

When O'Meara receives an alert from a trap, he turns to a separate set of diagnostic tools to pinpoint exactly where the problem lies. He then turns that information over to the network engineering department, which actually figures out how to fix the problem.

Users find new performance management tools help them anticipate end-user complaints and nip net problems in the bud.

While there are shortcomings, these performance management tools nonetheless provide a level of information that users have been searching for, says Susan Aldrich, an analyst at Patricia Seybold Group in Boston. Up to now, users haven't been able to get a good read on average user-response times and therefore can't be certain when the times get better or worse.

"It's a big step forward to say, 'Yeah, there is a problem and this is how bad the problem is, response time has deteriorated from one second to 2.5 seconds over the past month," Aldrich says. "Although at this stage, you've still got a lot of investigating to do to figure out what you could do to improve the situation."

But users swear by these new performance management tools. Traditional network management tools do a good job of pinpointing when a particular circuit is going from 40% to 60% utilization, but they don't indicate what impact, if any, the increase has on end users.

"My problem was that I would get a user calling in the morning saying, 'My response time is poor,'" says Tony Fortwengler, director of technical services at Southwest Gas Corp. in Las Vegas.

Fortwengler says he was frustrated because he had no way of measuring end-user response time for the client/server-based inventory and work-order system, and no way of anticipating what kinds of problems were lurking just over the horizon. "It was always an after-the-fact thing."

Fortwengler went searching on the Internet and found a product called FirstSense from FirstSense Software. He installed FirstSense agents on one workstation at each of 50 branch offices in the Southwest where the natural gas company's 500 trucks receive their work orders. The FirstSense tool not only alerted Fortwengler to a slowdown in application performance, it also narrowed the problem down to the WAN. "It was real good data that we couldn't get previously," he says.

Fortwengler replaced the 56K bit/sec private lines that ran between each site and the main office in Las Vegas with T-1 frame relay links and saw average response times drop from 30 seconds to three seconds. Skeptics could argue that adding bandwidth was the obvious solution all along, but FirstSense gave him the ammunition he needed to prove that the problem existed. Likewise, after he upgraded the network he had solid numbers, which he presented to users and upper management to prove the upgrade worked.

Performance management tools can raise some implementation and privacy issues. Kevin Kelly, manager of network management for administrative information systems at the University of Illinois' Champaign-Urbana campus, says some end users on campus object to having tools on their desktops that monitor their activities.

Two ways to track app performance

For best results, analysts recommend using a combination of two types of products.

Synthetic transaction tools: an application script is programmed to initiate a virtual transaction at periodic intervals.

Pros

▲ Easier to deploy
▲ Information can be gathered around the clock
▲ Provides solid statistical base for analyzing network performance

Cons

▼ Synthetic transactions can never totally re-create the experience of real users

Vendors: Ganymede Software, Proactive Networks, Jyra Research

Client-based monitoring: desktop agents are used to monitor actual user transactions.

Pros

▲ Provides the best source of information on actual user experience

Cons

▼ Requires extensive software distribution
▼ Produces voluminous amounts of data that must be aggregated and analyzed

Vendors: FirstSense Software, INSoft (formerly VitalSigns Software)

As a result, Kelly is moving slowly in his rollout of the VitalSigns performance monitoring tool from INSoft. Since July, he has installed the VitalSigns agent on only 125 of more than 4,000 desktop machines scattered across campus.

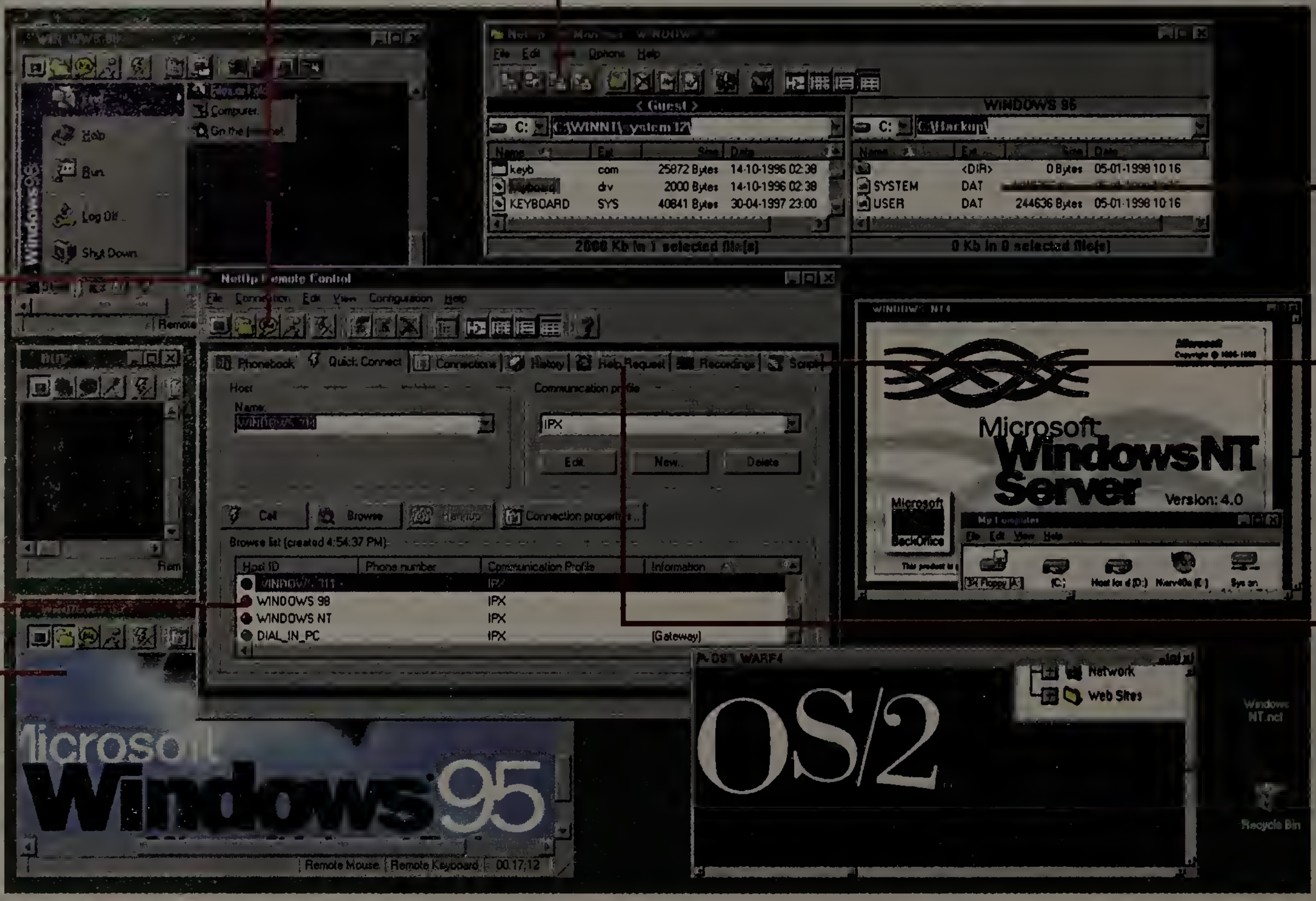
And in many cases he's installing VitalSigns only after someone complains about poor performance, which he acknowledges defeats the software's proactive capabilities, in a sense.

Still, Kelly is bullish about the product. End users simply go to a Web site and download a 1M-byte file that loads in about a minute, he says. The software agents report back to a central database on everything from whether a connection attempt has failed to how long it takes to make a connection to the actual throughput.

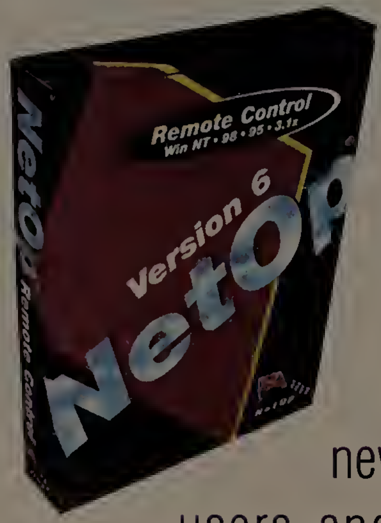
NationsBank's O'Meara makes this bold prediction: "As this technology evolves, I see 50% of network problems engineered out of existence before the user even rides the wires. I firmly believe that."

Even the skeptical Aldrich sees network managers turning to performance management tools. While the tools aren't perfect, she says managers "can't stand knowing nothing." ◪

New NetOp 6.0


Type-and-talk communication—ideal for support functions
Delta file transfer, crash recovery, copy, move, clone, and synchronize features
Fast and easy drag-and-drop file transfer
Full Range of security options
Powerful scripting tool for scheduled transfers and program launches
Simple browse-and-click PC connection
Sophisticated help-request feature
Individual windows or full-screen zoom in any resolution
Microsoft Windows NT Server
OS/2
Microsoft Windows 95

NetOp Introduces a faster way to Remote Control any PC on any platform



The product PC Magazine called "fastest by far" running Windows over networks has gotten even faster — up to 75% faster! You're invited to try the **NEW** NetOp Remote Control for Windows v6.0. NetOp works on every PC in your company: Windows NT, 95/98, older Windows 3.X or DOS machines and even OS/2. Plus you can control distant PC's over modems, networks or the Internet. With advanced security options and new help desk features, NetOp is ideal for network administration, supporting users and providing superior dial-in for remote computing. ***Best of all — you can try it FREE!*** **Call us at 800-675-0729 or download your fully-functional evaluation copy at www.CrossTec.Net.**

Ask about NetOp School: Six essential tools for the networked classroom.

NetOp and the red kite are registered trademarks of Danware Data A/S.
Other brand and product names are trademarks of their respective holders.
© 1998 Copyright Danware Data A/S. All rights reserved

CrossTec Corporation
NetOp is available from CrossTec Corporation

Free Product info enter NWInfoXpress #56 online @ **www.networkworld.com/infoxpress**

BY DENNIS WILLIAMS

APPLICATION DELIVERY ON A GRAND SCALE

Castanet 4.0 distributes applications easily, securely and reliably over intranets, extranets and the Internet.

Falling somewhere between a software distribution application and an Internet systems manager is Marimba's Castanet 4.0, released last week. Castanet exceeds the scope of most software distribution tools, spanning multiple platforms and network environments, including local networks, intranets and extranets. It uses the Internet to manage application and data distribution across global networks. With a browser-based client, Castanet works with any operating system. Server-side software is available for Windows 95, 98 and NT, as well as Solaris, HP UX and IBM AIX.

Marimba borrows radio terminology to describe Castanet's components. The client-side software is a Web-based interface called a tuner, which clients use to subscribe to or launch applications, called channels. A transmitter sits on the server side and stores published channels.

Beneath the radio lingo, Castanet consists of multiple suites with specific functions. The Infrastructure Suite is the foundation, responsible for deploying files and applications. Part of the Infrastructure Suite, and new in Version 4.0, is an authentication extension that allows Castanet to tie into existing authentication systems, such as Novell Directory Services and Windows NT domains. Castanet also supports security standards, including Secure Socket Layer; public-key infrastructure certificates; code signing to ensure the authenticity of downloaded applications; and 40- and 128-bit encryption.

Castanet's Management Suite delivers centralized control of all deployed applications. You can set desktop configurations, view and revise network and security parameters, and update distribution management schedules. The Management Suite also lets you remotely manage tuners.

The Production Suite lets you package and publish applications and data for deployment. You can download a number of sample applications from Marimba's transmitter or create your own packages for distribution using the Application Packager and its package-creation wizard. Application Packager supports shrink-wrapped and custom Windows applications, Visual Basic applications and data file packages.

The Application Packager takes a snapshot of the system on which it's running before and after you install the application. The differences in Windows configuration file entries and the registry are noted and duplicated on client desktops.

Unfortunately, the process is painfully slow. When we created a package of a shrink-wrapped Windows application, it took almost two hours for Application Packager to generate a single snapshot of our NT Server. Then it took another 10 minutes just to save the snapshot file to disk on a 266-MHz dual Pentium II server with a high-speed RAID subsystem. However, once the process was complete, the application was easily accessible to network clients, who could download and install it with a single click.

The Castanet tuner interface allows users to browse transmitters by entering their URLs. Users can select the channels to which they want to subscribe, which initiates the downloading and installation of the selected applications. You can distribute preconfigured tuner software to clients to provide them with the levels of flexibility or control you deem appropriate. For many users, you may simply provide them with the URL to your transmitter and allow the clients to update their own systems. You can also control everything by making the tuner software completely transparent and pushing software to client desktops.

Two new product suites included in Castanet 4.0 work in conjunction with each other to ease application management. The first is the Inventory Suite, which allows you to poll client desktops to determine hardware type, operating system version, remaining disk space and existing applications, among other things. You must provide a database, such as Oracle8, to store the results on the server. Castanet's inventory agent scanned our clients quickly.

The Inventory Suite even supports users who are only intermittently connected to the network. For such users, the Castanet inventory agent performs the inventory at prescheduled intervals and returns the information to the transmitter when the network becomes available.

The second new suite is the Subscription Suite, which lets you manage enterprisewide policies regarding which applications or machines each user or group of users may access.

Flexibility pays

Getting started with Castanet is fairly easy. Instead of installing the tuner from a CD-ROM, we downloaded it from the Internet. We installed a tuner on each of our computers and on an NT server. Then we connected to Marimba's transmitter over the Internet and downloaded the transmitter software, administration software and a package creation utility; each component installed automatically after download. As long as you're connected to the Internet, the components are automatically updated if there's a revision on Marimba's site.

If you have a diverse network environment, you'll appreciate Castanet's ability to create customized channels based on user profiles. You can use the results of your inventory queries to specify which computers need the Windows version of an application and which need the Unix version, for example. Or you can distribute software to a user group, such as a sales department. If you choose to make the client-side tuner transparent to end users, only the applications you select will be installed — automatically and without user intervention.

Castanet is well-suited for companies with large heterogeneous networks. It allows you to set up multiple transmitters, which promotes load sharing. Smaller companies with mobile or distributed users can also benefit from the product. However, traditional LANs that don't use the Internet for network connectivity may be better served by conventional software distribution applications with a lower price tag.

Williams is a freelance writer and product improvement consultant in Alpine, Utah. He can be reached at Dennis@ProductReviews.com.

Net Results

Castanet 4.0
Marimba
(650) 930-5282
www.marimba.com/products/castanet.htm
$10,000 for basic installation; additional fees depending on numbers of applications and end points

Pros

- ▲ Distributes software over multiple platforms and networking environments
- ▲ Accommodates mobile clients

Cons

- ▼ Complex setup for advanced features
- ▼ Slow package-creation tool

ScoreCard

Castanet 4.0

Server support (25%)	8 x .25 = 2.00
Client support (25%)	10 x .25 = 2.50
Performance (20%)	7 x .20 = 1.40
Security (15%)	10 x .15 = 1.50
Ease of use (5%)	6 x .05 = 0.30
Installation (5%)	9 x .05 = 0.45
Documentation (5%)	7 x .05 = 0.35
Total score	8.50

Individual category scores are based on a scale of 1 to 10. **Percentages** are the weight given each category in determining the **total score.**

More Online
FIND IT 2126 ON FUSION
www.nwfusion.com
- How we did it
- Our review of desktop management suites with software distribution capabilities
- Marimba's views on securing Internet software distribution.

BY LISA SWEET

Review

WHO'S INVADING YOUR TURF?

While eNTrax Security Suite checks NT server logs, a lack of network detection leaves a big hole.

ScoreCard

	Monitoring 40%	Security assessment 30%	Useability 20%	Installation 5%	Documentation 5%	Total score
eNTrax Security Suite 2.1	6 x .40 = 2.4	4 x .30 = 1.2	6 x .20 = 1.2	10 x .05 = 0.5	6 x .05 = 0.3	5.6

Individual category scores are based on a scale of 1 to 10. **Percentages** are the weight given each category in determining the **total score.**

Now that you're opening your systems to users outside the LAN, detecting security holes and preventing attacks are more important than ever. Security analysis, network monitoring and intrusion detection are a must.

While Centrax claims its eNTrax Security Suite 2.1 is all that you need and more, our testing showed that the product is really a high-priced NT log file analyzer application that focuses on internal intrusion. It suffers from several drawbacks: eNTrax requires a dedicated NT or Solaris server for a console because it's CPU-intensive to process security logs; it provides only rudimentary security assessment on servers; it lacks Windows 95 and 98 agents, making it impossible to log off users who are indulging in questionable behavior; and it does not distinguish between remote and local users.

On the plus side, the newly upgraded suite includes more security assessments, around-the-clock monitoring and notification of security threats, better activity detection and access to centralized event log data. It now runs on Windows NT and Solaris.

We began testing eNTrax by running a security assessment on our servers. From the Assessment Manager on the console, each server is rated in terms of overall security. eNTrax generates reports and shows a rating of poor, fair or good for the server's drive configuration, logon configuration, system configuration, password summary, screen savers and user accounts.

Unfortunately, we found that the security assessment furnished little useful information. The only redeeming features of the assessments were the suggested registry changes, which we would otherwise need to look up in a reference book.

The program comes with 100 predefined security audit policies for NT and 60 to 80 audit policies for Solaris. The policies can be customized to meet your needs using a simple graphical user interface. For instance, you can easily tell eNTrax to alert you if a specific file is accessed.

We created our own audit policy by making a decoy file. If anyone tried to access this file, the console pinpointed the user violating the policy — but only if the user was running a copy of NT Workstation with the eNTrax agent installed.

Net Results

eNTrax Security Suite 2.1
Centrax
(800) 546-7733, www.centraxcorp.com
$12,995 for one console, 10 servers and 100 workstations

Pros

▲ Large list of predefined security policies
▲ Extensive reporting capabilities
▲ Multiplatform NT and Solaris support

Cons

▼ Security assessment reports are too simplistic
▼ Cannot distinguish between remote and local users
▼ High price tag
▼ Dedicated server required

You can assign different audit policies for individual users or groups. Unfortunately, eNTrax can only monitor files stored on NT File System volumes, so you'll need another tool to monitor files stored on any File Allocation Table volumes at your site.

While eNTrax provides the tools to report on the ways your servers are being accessed, the audit policies cannot be enforced. Instead, after receiving an alert, you need to address the problem manually based on the suggestions eNTrax provides. For a product that is this expensive, we think you should be able to associate actions with alerts to enforce policies.

The second pillar upon which eNTrax is built is security monitoring. When a security violation is recorded, the software can send alert notifications via a pager or e-mail, or to your network management console via SNMP.

From the Alert Monitor screen on the console, we could see all the events for both servers on which we installed the agent. Events are collected from server logs on a schedule you can set: once, twice or four times per day, hourly or near real time. Events can be anything from a user logging on to the illegal access of a file. When you click on an event, eNTrax characterizes it as critical, concerned or cautious, indicating the level of importance eNTrax attaches to the event.

The software suggests ways to tighten security. As with the security assessment module, we found the suggestions to be fundamental at best.

eNTrax cannot distinguish among local, remote or File Transfer Protocol (FTP) logons, and it's not capable of reporting the port on which a remote user is trying to enter, which is a critical piece of information when trying to ward off intruders.

The best feature of eNTrax is its reporting capability. There are 12 canned reports that can be modified, generated and exported to a number of different formats, including HTML, Crystal Report Writer and Microsoft Excel. eNTrax collects so much data that these reports are helpful in pinpointing abuse.

Installation is easy. After we installed the software on the console server, we created a target diskette to install the agent software on the NT servers and the NT workstations we wanted to monitor. The installation of the agent on another NT 4.0 server and NT 4.0 workstation was equally easy. Once we rebooted the second server it was recognized by our console server.

We found that eNTrax is a useful tool for pointing out failed logons, irregular logons and attempted access to files and folders to which users don't have rights. But because eNTrax relies solely on NT log files, it cannot detect outside attacks.

While eNTrax Security Suite 2.1 shows improvement over Version 2.0, we'd like to see Centrax add network-based tools, which could act as packet detectors for the entire network, to track internal and external intrusions. The combination of host- and network-based tools provides a much stronger detection shield. We'd also like to see Windows 95 and 98 workstation support; a means to differentiate between remote and local users; the ability to log off FTP and other remote users; and the ability to automatically enforce security policies. Until these improvements are made, we can't recommend eNTrax as a complete security suite.

How We Did It

We installed eNTrax 2.1 on two Pentium-based Windows NT 4.0 servers running Service Pack 3. The first server was a dedicated console, and the second was a server we monitored. We also installed the agent on an NT workstation.

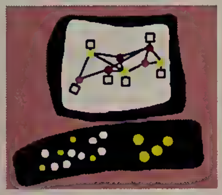
We ran the security assessment feature and viewed its reports. We also created new users without full access rights and tried to log on to directories to which the user did not have rights. We then created a file and assigned audit policies to it. We also tried pinging and FTPing into the servers running the eNTrax agent. Finally, we tested remote logons.

Sweet is vice president at Edgewood Consulting Group in Emerald Hills, Calif. She can be reached at lsweet@edgewood-group.com.

A *Network World* Special Advertising Section

your E-COMMERCE Resource Feature

CHECK POINT™
Software Technologies Ltd.



Check Point Software Technologies Ltd.
Product name: VPN-1 Gateway
(650) 628-2000
www.checkpoint.com

Check Point Software's VPN-1 Gateway is a software offering that incorporates Check Point Software's superior VPN functionality with the security features of its award-winning FireWall-1® enterprise security suite in a single package. It's available in configurations for a variety of customer needs, from single-site, remote-office installations to multi-site, enterprise-wide deployments with centralized management requirements.

MetaConnect™
Merging Data, Managing Change.

ISOCOR
Product name: MetaConnect®
(310) 581-8100
www.isocor.com

ISOCOR's new meta-directory product family of solutions is MetaConnect®. MetaConnect is designed to speed a company's ability to unify their data for effective intranets and to conduct business on the Internet. It utilizes a join engine to provide accurate, updated information to employees, customers and trading partners, from existing data sources. It is directory independent, offers near real-time change propagation, openness, scalability and performance.

MCI WORLDCOM

MCI WorldCom Advanced Networks
(800) 433-0389
www.wcom.net

MCI WorldCom Advanced Networks, an MCI WorldCom company, provides networking and hosting solutions in 114 countries. We have the expertise to offer leading-edge technology solutions to large corporations with mission-critical applications. More than 3,300 companies world-wide rely on our completely managed, fully integrated Internet, intranet, VPN, hosting and e-commerce services.

Momentum Systems
Tom Corr, *President*
(609) 727-0777
www.momsys.com

The growth of Internet storefronts has created a demand for products that link storefronts to back-end applications. Momentum Systems develops e-commerce software for the distribution of files critical to business-to-business communications. Our products automatically and securely exchange information between an organization and its trading partners and provide file distribution services for web-based applications.

Ringdale, Inc.
Product Name: PrintPro® 99
(512) 288-9080
www.ringdale.com

The PrintPro® 99 connects any laser, dot matrix, inkjet printer or plotter with a parallel port, to a 10baseT Ethernet network. The PrintPro 99 can receive Internet faxes from IETF compliant fax machines. It can also receive text e-mails and embedded, pre-formatted print files via the Internet or local network.

2/99—DK—00018

All efforts have been made to make this listing as complete and accurate as possible. *Network World* is not liable for errors or omissions.

ProVision

The power to increase availability across the enterprise with a single modular solution.

Your search is over.

Performance Management

The more complex your environment, the more critical it is to deliver 24x7 monitoring and comprehensive event management. And this is precisely what ProVision Performance Management tools provide. Across platforms and departments. All from a single console.

Simply point and click to move seamlessly between tools, rewinding and replaying events to access historical information on how applications, databases, servers, workstations and the network are being used. Plus, multiple threshold alarming actually preempts problems to keep your enterprise running at peak efficiency.

Maximizing service levels. Minimizing stress levels. So you can focus on raising enterprise availability and business productivity to record levels.

Call 1-800-890-7528 x10203 or visit **www.platinum.com/pmsearch**

- Applications
- Databases
- Desktops
- Networks
- Systems

make IT shine™

data • systems • apps

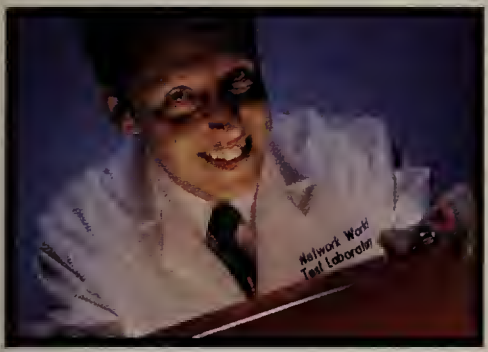
PLATINUM
TECHNOLOGY

©1999 PLATINUM *technology, inc.* All rights reserved.

Free Product info enter NWInfoXpress #62 online @ **www.networkworld.com/infoxpress**

Cool Tools

Quick takes on high-tech toys



Lee Schlesinger, Test Center director

THE LAST MODEM YOU'LL EVER NEED

The modem isn't dead, but it's dragging, thanks to the sub-56K bit/sec limit of the V.90 standard. That's just too slow, especially where digital subscriber line and cable modems are available.

With no prospect for higher-speed analog modems on the horizon, vendors are doing what they can to extend the modem's appeal and life span. Multi-Tech Systems' answer is to bundle every conceivable phone-line device into a single box and price the box very reasonably. Multi-Tech's MessageSaver includes a V.90 modem with 14.4K bit/sec fax capabilities, an answering machine and a speakerphone, all in a box smaller and lighter than a videocassette.

Because MessageSaver is an external device, it's powered up even when your PC isn't, so it can take answering machine messages (up to 30 minutes worth) and accept faxes (as many as 30 pages) even when the PC is off.

The answering machine lets you choose between regular or answer-only modes; in the latter, callers only hear your outgoing message and can't leave you one. You can record and store a different message for each mode, if you want to switch between the two, or use the curt message that comes with the product. You can play back messages through your computer's sound card, the modem or a telephone handset connected to the modem. You can also retrieve messages from a remote location by dialing in and entering a four-digit security code, but the MessageSaver lacks voice prompts to lead you through that process.

A dialer application includes an address book with names and telephone numbers, but you can't import numbers you already have in another application.

All the device's functions are controlled by BVRP Software's PhoneTools 2.0 application. One of PhoneTools' big drawbacks is its inability to share the COM port to which the modem is connected. That means you can't run a remote-control application such as Traveling Software's LapLink Professional and PhoneTools at the same time.

I wasn't too happy with the answering machine either. You can't set it to answer in fewer than three rings, which is silly when you're using it only for fax or data.

The fax capabilities of the software are basic but adequate for the occasional faxer.

The MessageSaver is a fine modem, and its other features are a nice bonus. If you don't already have a modem or fax software, it's a good package at a reasonable price. If you already have a V.90 data/fax modem, apply your budget dollars to Symantec's TalkWorks Pro. At $140, it's the Cadillac of voice/fax software.

Net Results

MessageSaver
Multi-Tech Systems
(800) 328-9717
(612) 785-3500
www.multitech.com/products/FamilyHomePages/tn.asp?ID=29
$179
Bottom line: *A state-of-the-art modem with some handy extras.*

Solutions for networking voice & data around the world.

Service providers and systems integrators need data and voice solutions that will meet their global networking needs. Whether it's connecting networks in the U.S. with those worldwide or designing and building networks for specific applications around the globe, RAD Data Communications has the systems, expertise, and fifteen years of experience to meet their demands.

RAD's product lines include conversion products like T1 to E1 and E1 to T1 converters and other products that allow you to run E1 over T1 lines in the U.S., T1 over the E1 networks in ROW, and E1/R2MFC to DTMF signaling conversion for telephony applications.

Other product lines include E1-DSU/CSU, E1-HDSL modems, E1, E2 & E3 multiplexers for voice, data and Ethernet over copper and fiber, E1 digital cross-connects and N*E1 inverse multiplexers.

A titan among U.S. interexchange carriers is utilizing RAD's inverse multiplexers as the basis for their E1 service in the U.S. And one of the largest international systems integrators is using RAD's multiplexers for command and control systems in Asia. What's more, RAD's DXC-30 is a very popular solution for T1/E1 conversion.

Why not contact RAD today and find out how we can help you with your global networking needs.

RAD data communications

People and products you can rely on.

http://www.rad.com e-mail: market@radusa.com Toll Free: 1-800-444-7234 International: Telephone: 972-3-6458181 RAD Data Communications, Inc.

Free Product info enter NWInfoXpress #65 online @ www.networkworld.com/infoxpress

Management Strategies

Career Development, Project Management, Business Justification

Plan for the worst

Succession planning helps keep the network running, even through the most trying of times.

BY LORETTA W. PRENCIPE

Carpooling on a winter night, two Database Technologies executives and a key employee got stuck in a construction slowdown on the Massachusetts Turnpike. Seconds later, an 18-wheeler rolled over their car. Chief Operating Officer Michael Corey and CEO David Teplow survived, but their colleague did not.

After the December 1996 accident, the Wellesley, Mass.-based software vendor dropped off a six-year growth spurt and headed into a downward spiral. For several months, neither Corey nor Teplow was physically able to work. The company lost contracts and employees jumped ship. "This nearly put us out of the business," Corey says.

Corey and Teplow returned to work full-time in late 1997 and guided the business back to profitability. Since the accident, the two have made personnel succession planning an integral part of Database Technologies' corporate culture.

Large conglomerates have been lining up heirs to the corner office for years, but these days knowledge management is the buzzword and corporate America's bottom line is downright dependent on IT workers. What would you do if your staff didn't come to work tomorrow or ever again? If you don't have a concrete answer, Corey says you're violating your fiduciary duty to the company.

Michael Corey and David Teplow of Database Technologies were lucky to survive a serious car accident, but their business almost didn't make it.

SHAWN HENRY

Succession planning isn't as simple as deciding who will handle network duties while you're on vacation. Nor is good documentation all it takes. "Succession planning is about identifying people in an organization or a department who are capable of keeping it running," he says.

Naysayers will tell you that personnel contingencies can't work because of the constant turnover of IT workers. Not so, Corey says. Database Technologies' employee replacement plan includes mentoring and cross-training, both of which are good retention tools.

Dan Deakin is another believer. Deakin, divisional information officer for Academic Press, a San Diego-based publisher, asks all 20 of his employees where they want to be in five years. This lets him easily identify potential back-ups for each IT position and helps workers acquire needed skills.

"We probably discuss this plan once a month," he says.

Cross-training not only lends greater depth to contingency planning, but fosters employee loyalty because workers like to have a say in their career development and training. For example, Deakin learned that his Webmaster wanted to become a network engineer, so he trained the worker and then gave him the job.

Naturally, every company's succession plan model will vary. Deakin's blueprint is driven by employee career development. But at Diversified Computer Solutions, a network consulting firm in Atlanta, the plan is driven by client need. Clients can't be affected by an open job slot, says John Washer, a managing consultant who oversees the company's internal network and a team of five network consultants.

Washer's two senior staffers spend three weeks per month at a client site. For the fourth week, a junior consultant takes charge of the site. Should a senior-level consultant resign, the junior consultant would take over and manage the client's network.

"We relate our plan to being an understudy in a play," he says.

Diversified Computer Solutions' plan has another advantage, Washer says. Junior-level team members get experience managing their colleagues in short bursts. "Even with an understudy, there's always that stage fright. But this way the learning curve and stress are minimal," he says.

Minimizing employee stress is really what IT personnel succession planning is all about, Database Technologies' Corey says: "Should you do succession planning? You damn well better if you care about your people."

Prencipe is a freelance writer and attorney in Springfield, Va. She can be reached at LWPrencipe@excite.com.

Keep it together

To develop a personnel succession plan, try the following pointers from Brenda CurryCole, human resources director for Madentech Consulting in Arlington, Va.

- Crosstrain your IT team members.
- Mentor lower-level employees.
- Circumstances change, so reassess your succession plan every few months.
- Familiarize your staff with the details of the succession plan to ensure a seamless transition.
- Sell the plan to non-IT executives whose support can get you funding.
- Use your firm's succession plan as an employee career development tool.
- Good documentation, while crucial, is no substitute for succession planning. People fill in – not papers.

More Online
- **Tips on succession planning.**

www.nwfusion.com

FIND IT ON FUSION DocFinder 2129

NETWORKING CAREERS

For information about placing a recruitment advertisement, talk to Network World:

Dodi Rabinovitz
(800) 622-1108 x7454
E-Mail:
drabinov@nwwa.com

Karima Zannotti
(Northern United States)
(800) 622-1108 x7488
E-Mail:
kzannott@nww.com

Sandy Weill
(Southern United States, and New York)
(800) 622-1108 x7542
E-Mail:
sweill@nww.com

Networking Careers
161 Worcester Road
Framingham, MA 01701
E-Mail:
ccapp@nww.com
800-622-1108 x7510
Fax: 508-820-0607

NetworkWorld

TECHNICAL EDITOR

(Brazilian Portuguese)
Review and vaildate 3rd party translations in Brazilian and Portuguese for linguistic quality and technical accuracy. Provide linguistic support to 3rd party translation vendors in the areas of translation, tools and procedures. You will develop and maintain terminology database, coordinate research and approval process and write and maintain style guides. Provide linguistic project management for translation portion of localization process. Provide translations as needed. Requires a BS or foreign degree equivalent in English, Technical Translation or related field. 2 years' experience in job offered or in technical translation, Brazilian Portuguese/English translation, or localization. Near native fluency in Brazilian Portugese and good technical writing skills in English and Portugese. Job site/interview: Provo, UT; $53,459/year, 40 hrs./wk.

Interested applicants should send this ad and your resume/ letter of qulaificatons to: Department of Workforce Services, Attn: Pat Redington, Job Order #3060757, 140 East 300 South, First Floor, Salt Lake City, UT 84111

NETWORK SECURITY/ENGINEERING

As one of the premier providers of internetwork consulting east of the Mississippi, RPM Consulting bases much of its success on hiring the best people and then giving them the training and employment opportunities to become even better.

We currently are seeking senior and mid-level engineers in the following disciplines for East Coast and Midwest positions.

- ***Network Security Design/Implementation***
- ***Network Management Design/Implementation***
- ***Internetwork Design/ Implementation***
- ***WAN Design/Implementation***

For additional information, please visit our website www.rpm.com or mail/fax your resume to:
RPM Consulting, 7130 Minstrel Way, Suite 230, Columbia, MD 21045 Attn: NW
Fax (410) 309-6070
Or send your resume electronically to:
NW@rpm.com

Web site: www.rpm.com

RPM CONSULTING

BERMUDA
Junior Telecommunications/PC Technologist
LAN/WAN/PBX/Windows NT/Lotus Notes/MS Office

BERMUDA-based global trading firm Trout Trading Mgmt. Co. Ltd. (TTMC) seeks highly motivated and enthusiastic **Junior Telecommunications/ PC Technologist** to be responsible for voice and data communications, networking, hardware, software and electronic financial quote services in our state-of-the-art environment. Technologist's primary responsibility encompasses all duties related to the voice and data network and secondary responsibilities include PC software and hardware administration, maintenance and support.

With 50 employees TTMC operates 24 hours a day from Bermuda and trades on major financial markets around the world. In support of its international trading, TTMC manages a global voice and data network comprised of frame relay circuits, IPL circuits, routers, multiplexers, networked PBX's and 10/100 base T ethernet.

One or more years of hands-on experience with either international voice or data networks, bridges, routers, and Nortel PBX's required. PC hardware, Windows NT, Lotus Notes and Microsoft Office experience a plus. Excellent time management skills, an eye for detail, strong organizational skills, ability to learn new concepts quickly and a superior work ethic are expected.

TTMC Technology Profile:
Telecommunications Related: Cisco Catalyst 5500, Fore Powerhub 5001, Gandalf Bridges, Cisco FastHub, Cisco 2501, 2503, 2516 routers, Ascom Timeplex Link 2+, Cray T1 Multiplexer, PCSI Voice/Data Multiplexer, Zetafax Fax/communication Server, Network Associates Sniffer, CiscoWorks, Checkpoint Firewall 1, Legato Backup Software, SpectraLogic, PictureTel Video Conferencing, ISDN, Frame Relay, International Private Lines, T1 data circuits, Burstable T1 Internet Access, Ring Down Circuits, PRI Voice circuits, Compressed Voice Tielines, Nortel Option 61C, Nortel Option 11C and 3 Nortel Companion Wireless Systems.

PC Related: SMS, Ghost, NT4.0, Microsoft Office 97, Lotus Notes, PC-NFS, Peachtree, Exceed and other business PC software applications.

Relocation to Bermuda and a minimum three-year commitment are required.

Email: leaw@waterint.com Fax: (416) 956-4715

Get a job

Las Vegas Convention Center
Rooms N109 & N110
May 11 & 12, 10:00 am - 6:00 pm
May 13, 10:00 am - 4:00 pm

To get updated information go to:
www.nwfusion.com

The NetworkWorld Career Fair

NETWORLD+INTEROP

Bring Plenty of Resumes!

Participating Companies to-date:

AT&T Solutions
www.att.com/solutions

Ascend Communications
Fax: 510-747-2623
Email: jobs@ascend.com
www.ascend.com

Axis Communications, Inc.
Fax: 781-938-1188
Email: lferraro@axisinc.com
www.axis.com

The Boeing Company
www.boeing.com/employment/

Enterprise Networking Systems
Fax: 650-568-0185
Email: jobs@ens.com
www.ens.com

F5 Networks, Inc.
www.f5.com

Fidelity Investments
Email: resumes@fmr.com
www.fidelity.com/jobs

General DataComm
Fax: 203-598-7944
Email: hr@gdc.com
www.gdc.com

GTE
www.gte.com

International Network Services
Email:staffing@ins.com
www.ins.com

Nortel Networks
Fax: 978-916-3510
Email: nortelnetworks@isearch.com
www.nortelnetworks.com

Shared Medical Systems
www.smed.com

US West
Fax: 303-896-5318
Email: recruit@uswest.com
www.uswest.com

Want to get from point A to point B?

(Just click the dice)

point B

Great paying high tech job at a great company with great benefits.

www.dice.com

point A

Mediocre paying high tech job at a mediocre company with mediocre benefits.

dice.com
High tech jobs online

Programmer Analyst: Regularly consultation with internal customers and need analysis. Responsible for supporting current customer applications, analyzing and evaluating business processes and systems. Participating in defining system requirements, computer programs and related information systems in enhancing existing or creating new applications to meet desired business results. Work with internal customer to design and plan the implementation of new relational database systems, or to enhance existing systems in Window platform by using Microsoft Access or Visual Basic and SQL Server. Administering, designing and implementing client-server database such as SQL server. Develop computer application specifications for universe Database, Pick Basic system in Unix platform. Involved in the designing, coding, debugging, and maintaining Pick Basic Programs. Provide PC application support, database user support, user training and technical documentation. Participates in learning and implementing the new technologies. Req: B.S. in Management Information Systems or Computer Science, Proficiency in Pick Basic, Visual Basic 5.0, SQL DB, HTML, Dbase IV, BASIC, COBOL, Pascal. 40hrs/wk, 8:00am-5:00pm, $33,072/yr, send 2 resumes to: DWE-ALC; P.O. Box 7972; Madison WI 53707-7972. Ref. File# C100683

NETWORK ADMINISTRATOR SYSTEM ANALYST: Provide System Administration in multi domain NT 4.0 Server and Workstation, Exchange 4.0, Internet Information Server, System Manager Server, SQL Server and a complete suite of development tools. Responsibilities include maintaining hardware and software upgrades, maintenance, back-up procedures, and management of the build process for our application and development of the installation process. Position is technically detailed requiring services of a well-oriented multitasking individual who can qualify as a specialist. Hardware skills: PC's, Ethernet Hubs; Modems; Bar-Code Scanning Technology; Ethernet Cabling Systems; Routers. Software skills: Windows NT Server; MS Internet Info Server; MS Exchange; MS Office; Visual Basic; COBOL; MS-DOS, Windows 3.1 and Windows for Workgroups; MS Mail; HTML Web Page Design; MS SQL Server; DBASE III+; C; VMS. Microsoft certification desirable. Require: Bachelors in Computer Science, two years network administration in windows environment. 8.00 to 5.00 pm, $50,000 per year. Send resume with social security number and Job Order# NC 4008864 DOT Code 030-167-014 to closest Job Service or to 2005B South Elm Eugene Street, Greensboro, NC 27406.

Feedback

Have an idea for a Networking Careers article?

Send your comments, ideas, and suggestions to

ccapp@nww.com

Network World's *Signature Series* issues, published bi-monthly, provide insights, opinions and information on the most important issues shaping the networked world. The award-winning Signature Series issues include:

THE NetworkWorld Signature SERIES

- ■ **The Network World 200 Issue** *4/26/99*
- ■ **The You Issue** *Showcasing the Network Leaders: 7/26/99*
- ■ **The Buzz Issue** *9/27/99*
- ■ **The Best Issue** *11/15/99*

For more information call: 800-622-1108 Ext. 7510

NetworkWorld Fusion

Network World Fusion brings print and online media together in a powerful and unique package. Every week, Fusion spotlights key news and feature articles from the print edition of Network World, adding new insights and offering links to a vast array of additional information resources within the sight and across the Web. Network World Fusion offers a wide range of advertising options to optimize your recruitment efforts including:

Online Recruitment Advertising

Brand Buttons

Banner Advertising

Email Advertising

Email Newsletters

Email List Rental

NetworkWorld
THE LEADER IN NETWORK KNOWLEDGE
Print • Online • Events

✆ **To get more details on any of these advertising options call: (800) 622-1108 x7510**

ACHIEVE YOUR VISION...

EXPERIENCE
EXCELLENCE
improved operational integrity

DEMONSTRATE
QUALITY
impressive designs

ENHANCE
PERFORMANCE
human friendly environments

Call the world leader in control center design, consoles and display walls.
1-888-725-9393 / www.econsole.com

EVANS

#324 @ www.networkworld.com/infoxpress

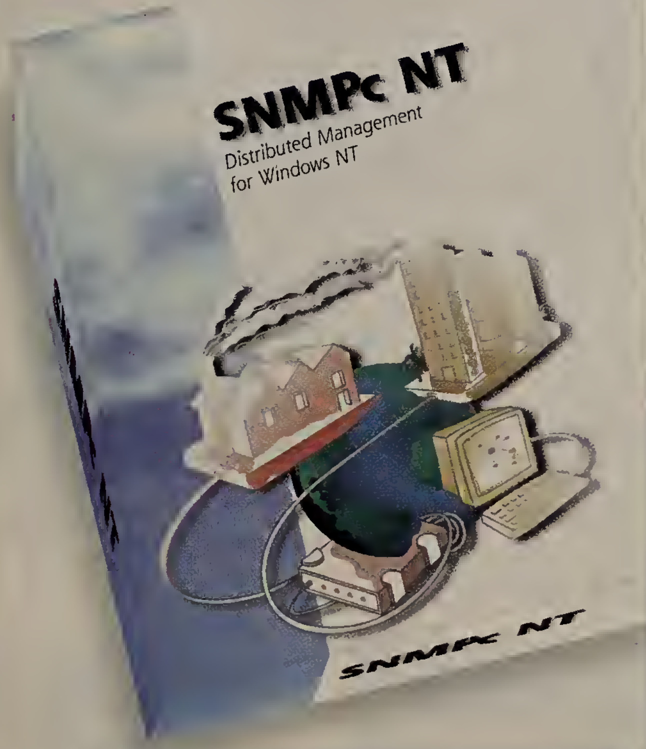
SNMPc Enterprise Manager

Distributed management for Windows NT. Supports remote consoles and polling agents, Web Trend Reporting and more.

SNMPc WorkGroup Manager

Affordable management for small networks. With an installed base of over 60,000 copies, this popular tool is resold by major OEMs, including Cisco and ACC.

Network Management
for Microsoft Windows



Castle Rock Computing
Phone: 408.366.6540
Fax: 408.252.2379

Download a Free Evaluation
www.castlerock.com

#252 @ www.networkworld.com/infoxpress

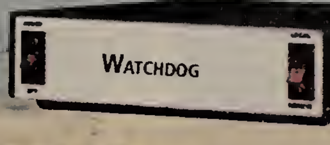
System LOCKED?
We've GOT the KEY!

Are Your Unattended Systems Locking-Up?
Don't Just do Something!

Sit there and relax.....

Let Watchdog 2000 monitor your systems 24 hours a day and *automatically reboot* them in the event of a lock-up! Without human intervention, then... receive an e-mail message advising you of the problem at the site

Watchdog 2000™



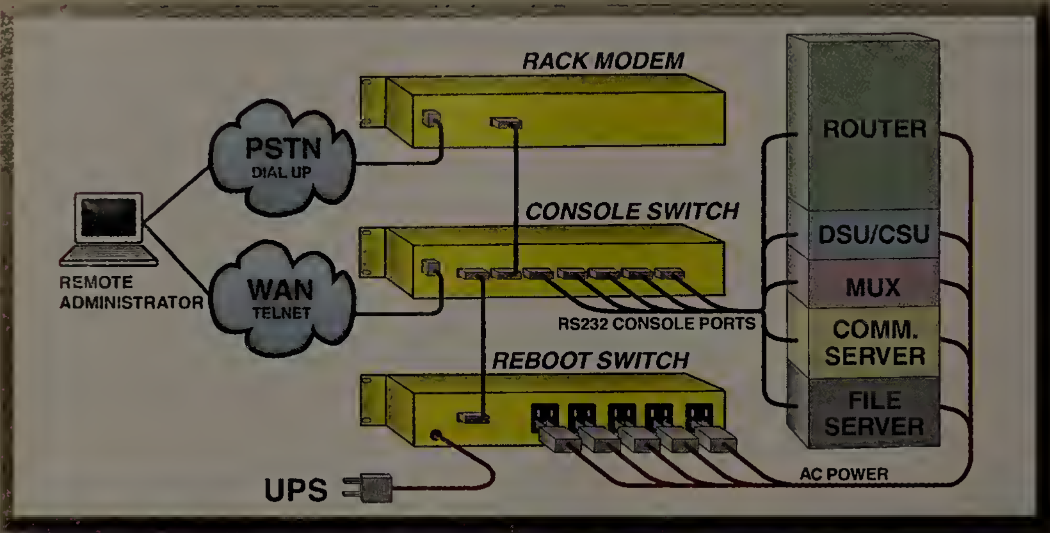
TeleSwitch Corp.
PH: 516-244-7075
FX: 516-244-5725
www.teleboot.com
sales@teleboot.com

CALL TODAY
TOLL FREE
1-877-652-7241

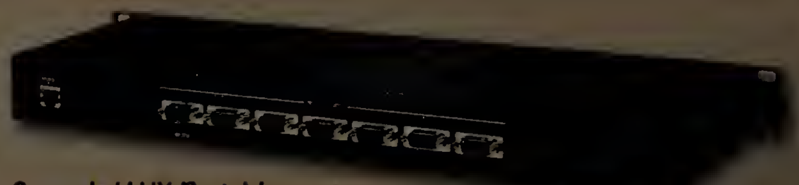
#321 @ www.networkworld.com/infoxpress

Remote Trouble-Shoot & Reboot

- ✓ Dial-up and telnet access to Remote Sites
- ✓ Select Multiple Console/AUX Ports
- ✓ Reboot power on selected devices



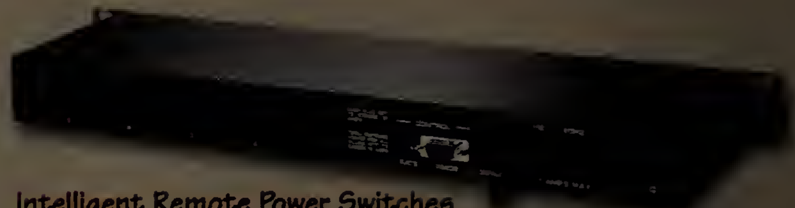
When it comes to Remote Site Management, no one offers more choices to access multiple console/AUX ports and/or reboot power than NetReach products from Western Telematic. We offer the flexibility you need to mix and match equipment for small or large remote management strategies. NetReach products are now installed in thousands of network sites world wide. Our customers know they can depend on our superior quality and reliability for their mission-critical operations.



Console/AUX Port Managers

Remote access to multiple RS-232 Console/AUX Ports

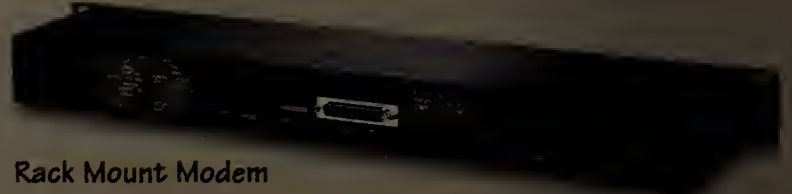
• TCP/IP (telnet) and dial-up (modem) • Continuous off-line buffering • Password Protected • Any-to-Any Port Matrix Switching • AC or -48V DC power options • Various models from 4 to 64 ports



Intelligent Remote Power Switches

Reboot "locked-up" network equipment

• AC and -48V DC versions • Password, Site ID, Plug Labels
• On/Off/Reboot power switching



Rack Mount Modem

Single modem for Dial-up acces to console ports

• AC and -48V DC powered • 33.6Kbps V.34+ • Requires only one 19" rack space

western™ telematic inc.

(800) 854-7226 · www.wti.com

5 Sterling, Irvine, CA 92618-2517
Facsimile: (949) 583-9514

#250 @ www.networkworld.com/infoxpress

Matrix KVM Switching ... Simplified

Demand Raritan.

Raritan
www.raritan.com

1-800-724-8090, X90
Phone: 732-764-8886 Fax: 732-764-8887
E-mail: sales@raritan.com

Get a hands-on demo at: COMDEX SPRING, Chicago, IL, April 19-22, Booth #C1335

#314 @ www.networkworld.com/infoxpress

When your old network monitoring tools don't fit anymore...

You've moved from a traditional SNA environment to TCP/IP. And you've outgrown your old tools. Bad news. Now that you're on a public network, you'll need to control your environment more than ever.

Are there TCP/IP tools? Of course, but only one solution, **e-Control**, offers you network monitoring, performance management, and problem diagnosis. That's a critical advantage for maximum control. Say a component fails or you have a security violation. With other solutions, you'll only know that a problem exists. With **e-Control**, you'll get the "what, where and how" of the problem, along with proactive alerts to help you avoid career-threatening technical disasters. You can also decide which events to highlight and who to notify in case of trouble, for faster, more efficient response.

e-Control is the perfect fit to keep your OS/390 servers and business running at top speed.

For a free demonstration CD or to order a product evaluation:
visit us at **www.interlink.com/offer**,
eMail us at **offer@interlink.com**, or
call us at **800.366.5452**.

...it's time to take e-Control of your TCP/IP data center.

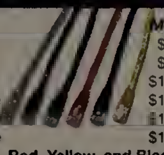
INTERLINK
COMPUTER SCIENCES™

©1999 Interlink Computer Sciences, Inc. All rights reserved. The Interlink Computer Sciences logo design is a trademark of Interlink Computer Sciences, Inc.

LASTAR DATACOMM SOLUTIONS

Call Us Today...Get Connected TOMORROW!

350MHz Enhanced CAT 5 Patch Cords



Description	MSRP
[illegible] Datatwist™ 350MHz CAT 5 Patch Cable	$7.95
[illegible] Datatwist™ 350MHz CAT 5 Patch Cable	$9.95
[illegible] Datatwist™ 350MHz CAT 5 Patch Cable	$10.95
10' Datatwist™ 350MHz CAT 5 Patch Cable	$12.95
14' Datatwist™ 350MHz CAT 5 Patch Cable	$14.95
25' Datatwist™ 350MHz CAT 5 Patch Cable	$17.95

Your Choice of Colors: Grey, Blue, Green, Red, Yellow, and Black!

CAT 5 Patch Cords

Description	MSRP
1' CAT 5 Patch Cable	$3.35
2' CAT 5 Patch Cable	$3.59
3' CAT 5 Patch Cable	$3.95
5' CAT 5 Patch Cable	$4.45
7' CAT 5 Patch Cable	$4.95
10' CAT 5 Patch Cable	$5.95
14' CAT 5 Patch Cable	$6.95
25' CAT 5 Patch Cable	$8.95
35' CAT 5 Patch Cable	$8.95
25' CAT 5 Patch Cable	$10.75

Your Choice of Colors: Grey, Blue, Green, Red, Yellow, Black, & White!

PCI NICs

Description	Ref. #	MSRP
3Com 10/100 Auto-Sensing	17583	$89.95
3Com EtherLink XL (10Mbps)	18008	$59.95
Samsung 10/100	17345	$23.95
KTI 10/100 DEC Chipset	15428	$34.95
KTI 10/100 RealTek Chipset	17581	$29.95
KTI Combo 10Base-T	12765	$27.95
KTI MM ST Fiber	18550	$179.95

ISA NICs Are Also Available - Please Call For Part Numbers & Pricing!

Transceivers/Converters

Description	Ref. #	MSRP
ATI 10Base-T AUI Transceiver	04111	$27.95
ATI 100Base-TX MII Transceiver	12983	$189.95
KTI 10Base-T AUI Transceiver	12763	$21.95
KTI 10Base-2 BNC AUI Trans.	12762	$21.95
KTI 10Base-T/2 Converter	17374	$89.95
KTI 100Base-TX/FX Converter	17378	$389.95

We Also Offer A Full Line Of Products From Transition Networks - Please Call For Latest Part Numbers & Pricing!

Lastar also provides quality services such as network design and installation. Call us today or visit our website for more information!

Call for a FREE Full-Line Catalog!!

Hubs/Switches/Routers

Lastar Carries A Full Line Of Switches From The Industry's Leading Manufacturers Including:

3Com • Cabletron Systems • Cisco Systems Premier Certified • Samsung • KTI Networks

Special Offer - KTI 8-Port 10/100Base-TX NWay Workgroup Switch With Expansion Slot Is Now Only $399.95!! NEW!

Power Protection

Lastar Proudly Features Power Protection Products From

APC American Power Conversion • Tripp Lite

Special Offer - Get The New USB/Windows™ 98 Enhanced APC Pro 350 For Only $179.95 NEW!

Structured Cabling Products

Quality Structured Cabling Components From Quality Manufacturers:

AFC Link • apw enclosure products • Fluke • Hitachi, Hitachi Cable Manchester, Inc. • Ideal • Microtest® • Mod-Tap

800-291-6031 • www.lastar.net

Lastar Datacomm Solutions

1501 Webster St.
Dayton, OH 45404
Fax 937-223-6385
8:30am to 6pm M-F • Most Orders Ship Same Day Via UPS

MasterCard • VISA • American Express Cards

#315 @ www.networkworld.com/infoxpress

TimePlex Group

Go to the Source

For the lowest price on TimePlex Equipment

All hardware is staged
and pre-tested.
If it doesn't say
ISO TimePlex CERTIFIED
then it's not!

Engineering Support

Software/Prom Upgrades

Year 2000 Upgradable

ALL TIMEPLEX EQUIPMENT

FDDI
LINK/2+
LINK/1
LINK/100

CSU
microLINK
miniLINK
ROUTERS

TIME/LAN
TIME/PATH
MICROPLEXER
OEM

1-800-726-LINK ext. 1777

or Fax: 1-727-531-2102

#239 @ www.networkworld.com/infoxpress

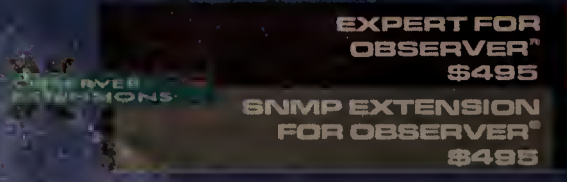
INTRODUCING LAN/WAN TROUBLESHOOTING AND PROTOCOL ANALYSIS SOFTWARE SO OBSERVANT, IT CAN SEE ALL PORTS ON YOUR SWITCH.

OBSERVER

Observer identifies network trouble spots, and costs thousands less than expensive hardware-based analyzers. If you have network slowdowns would you know if they are being caused by packet errors, broadcast storms or overloaded utilization? Find out with Observer or Distributed Observer.

- *Full packet capture and decode for over 300 protocols, including TCP/IP (v4 and v6), NetBIOS/NetBUEI, IPX/SPX, Appletalk, SNA, and DECnet.*
- *Switched mode sees all ports on a switch gathering statistics from the entire switch or packet capture from any port or portsFinally a* ***protocol analyzer that can be used in switched environments!***
- *Long-term network trending collects statistical baseline data for days, weeks, months or years for review and reporting.*
- *Distributed version available for $1290 (includes 1 local and 1 remote Probe). Additional Probes are $295 per local or remote segment or switch.*
- *Network Instruments' optimized ErrorTrack™ NDIS drivers display true errors-by-station. Includes collision expert.*
- *Track router utilization/traffic in real time*
- *Ethernet (10/100/1000), Token Ring, FDDI*

OBSERVER® 6 $995



EXPERT FOR OBSERVER™ $495

WEB EXTENSION FOR OBSERVER® $495

SNMP EXTENSION FOR OBSERVER® $495

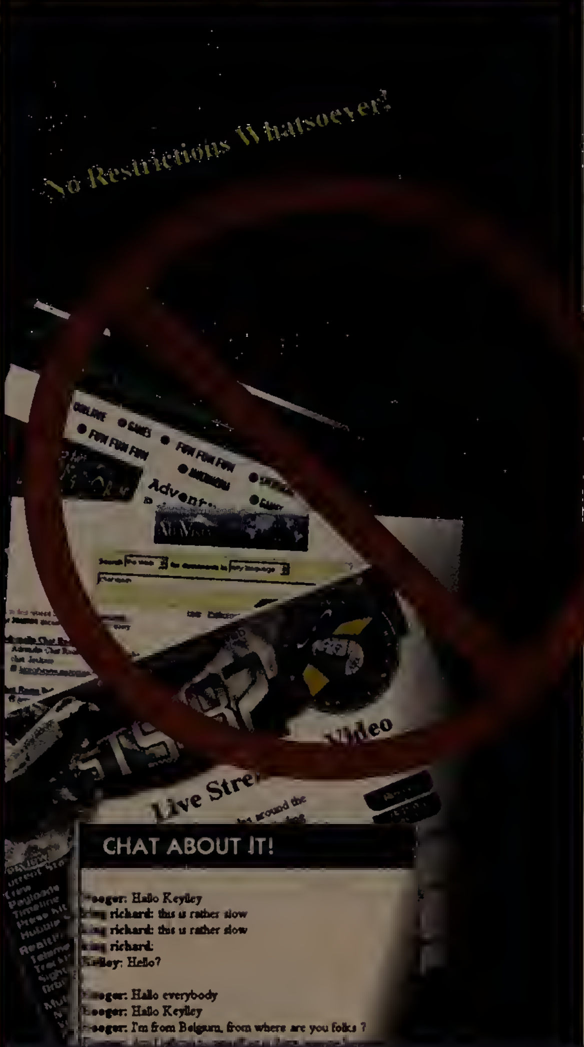
RMON(2) EXTENSION FOR OBSERVER® $495

See what you have been missing! Call 800-526-7919 for a FREE DEMO or download from our web site.

www.networkinstruments.com

© 1999 Network Instruments, LLC - Corporate Headquarters (612) 932-9899 FAX (612) 932-9545
[illegible] Europe +44 (0) 1322 303045 FAX +44 (0) 1322 303056 info@networkinstruments.com www.networkinstruments.com
Observer, Network Instruments and the N logo are registered trademarks of Network Instruments, LLC Minneapolis, MN USA

#290 @ www.networkworld.com/infoxpress



oeger: Hallo Keyley
richard: this is rather slow
richard: this is rather slow
richard:
Keyley: Hello?
oeger: Hallo everybody
oeger: Hallo Keyley
oeger: I'm from Belgium, from where are you folks ?

AT HOME, HOW YOU SURF IS YOUR BUSINESS.

AT WORK IT'S OURS.

Immediately increase productivity.

Monitor, report on, or block all Internet access.

LittleBrother™

"Little Brother is watching you use the Internet"

546 Valley Way Milpitas, CA 95035
Ph: 1.800.200.9881 Fax: 408.263.9883 sales@kansmen.com

#298 @ www.networkworld.com/infoxpress

Rocket Your Career with our FREE Self-Study Course!

Call Now to Get Your First Course at No Charge! (Limited Time Offer)

Discover the fast and easy way to boost your I.T. knowledge and prepare for I.T certification. Our computer-based training courses provide a learning environment that surpasses traditional classroom and video courses. See for yourself how ForeFront Direct can give you the skills you need to launch or accelerate your I.T. career. Call today for your FREE I.T. training course!

- Open the Door to Great Career Opportunities
- Raise Your Income
- Gain Valuable Skills, Knowledge and Technical Recognition
- Study at Your Own Pace
- Interactive Hands-on Exercises
- Online and Telephone Mentoring Available
- One-on-One Training Consulting

Self-Study Courses:

- MCSE
- MCSE+Internet
- MCP
- CNE
- Novell CIP
- CNA
- Oracle
- Lotus
- Webmaster
- PC Repair
- A+ Certification
- MCSD
- Visual Basic
- Visual C++
- Java
- C++
- Cisco
- UNIX
- Networking
- Office 97
- Windows 98
- And More!

TOLL FREE 1-877-TRAINING

TOLL FREE 1-877-872-4646

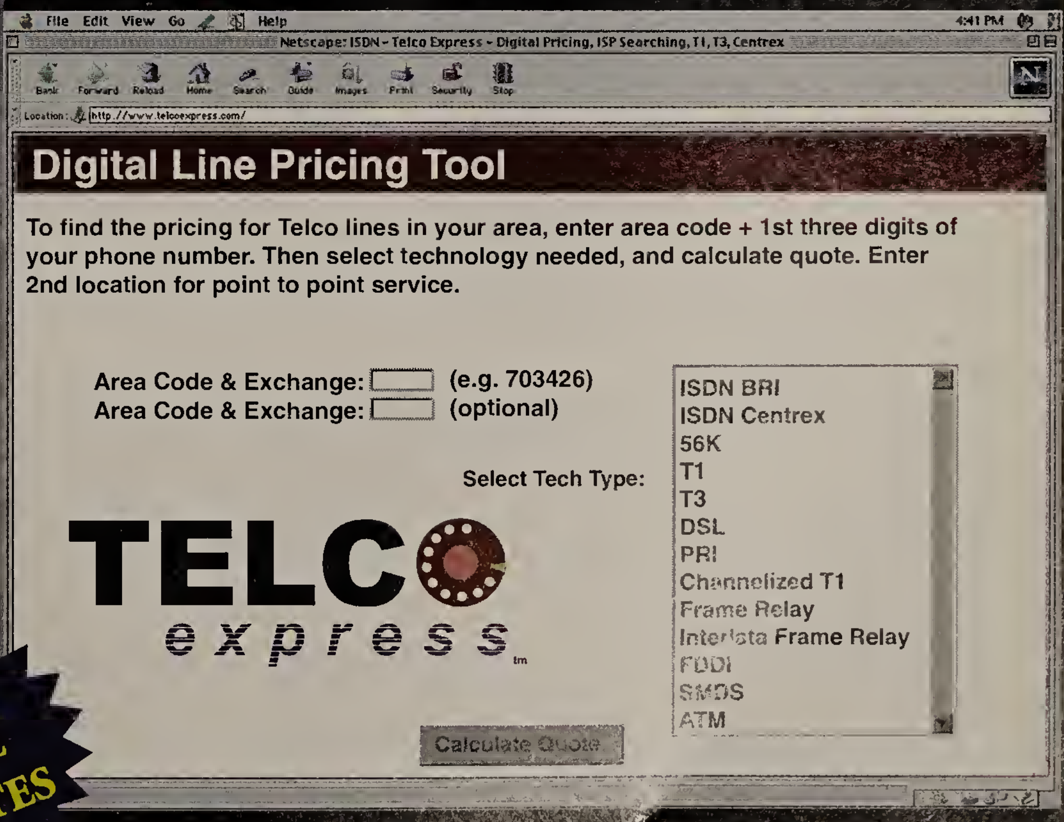
NWM

(800)475-5831 • (727)724-8994 • Fax: (727)726-6922 • www.techcourses.com

FOREFRONT
DIRECT
A CBT Group Company

#237 @ www.networkworld.com/infoxpress

Or will it be this?



Netscape: ISDN - Telco Express - Digital Pricing, ISP Searching, T1, T3, Centrex

Location: http://www.telcoexpress.com/

Digital Line Pricing Tool

To find the pricing for Telco lines in your area, enter area code + 1st three digits of your phone number. Then select technology needed, and calculate quote. Enter 2nd location for point to point service.

Area Code & Exchange: ☐ (e.g. 703426)
Area Code & Exchange: ☐ (optional)

Select Tech Type:

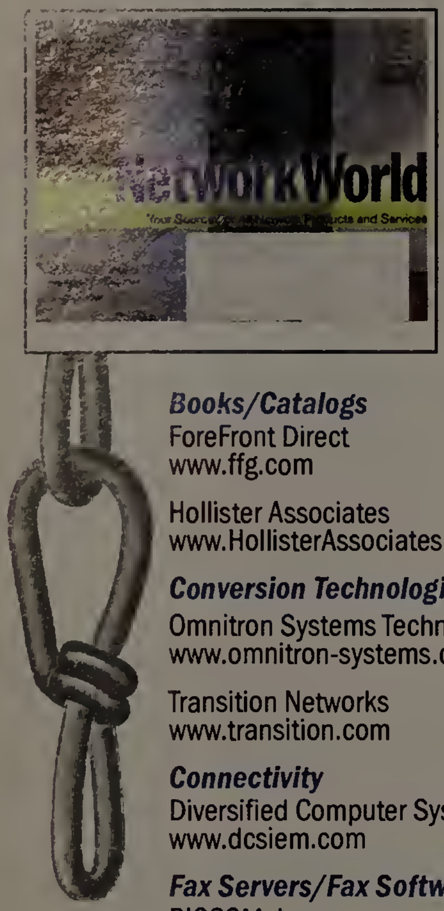
ISDN BRI
ISDN Centrex
56K
T1
T3
DSL
PRI
Channelized T1
Frame Relay
Interlata Frame Relay
FDDI
SMDS
ATM

TELCO express

The New Brand of Telecommunication Service

877-988-6484

#303 @ www.networkworld.com/infoxpress



Looking for more products and services?
Get linked to *Network World's* March card deck advertisers.

Network World *Direct Response Card Decks are published 6 times a year. They deliver the products and services you're looking for — information on computer hardware, software, LANs, internetworking products and services, Internet/intranet products, data/voice equipment and more. Visit these advertisers' web sites today!*

Books/Catalogs
ForeFront Direct
www.ffg.com

Hollister Associates
www.HollisterAssociates.com

Conversion Technologies
Omnitron Systems Technology
www.omnitron-systems.com

Transition Networks
www.transition.com

Connectivity
Diversified Computer Systems
www.dcsiem.com

Fax Servers/Fax Software
BISCOM, Inc.
www.biscom.com

OMTOOL
www.omtool.com

Handheld Testing Devices
Electrodata, Inc
www.electrodata.com

Help Desk Software
Blue Ocean Software
www.blueocean.com

Network Furniture/ Enclosures/Cooling Systems
ADAPT, Inc.
www.coolestspot.com

American Network Products
www.networkcenter.com

D.L. Custom
www.dlcustom.com

Engineered Data Products, Inc.
www.edp-usa.com

Ergotron, Inc.
www.ergotron.com

Fisher Hamilton
www.fisherhamilton.com

InterMetro Industries Inc.
www.intermetro.com

The Salix Group
www.salixgroup.com

Systems Manufacturing Corp.
www.smcplus.com

Wright Line
www.wrightline.com

Network Management Tools/Software
DDR, Inc.
www.ddri.com

Help Desk Technology Corp.
www.HelpDeskEval.com/BCNW

Infinite Technologies
www.infinitevoice.com

Raritan Computer Inc.
www.raritan.com

SciNet Inc.
www.scinetcorp.com

Network Monitoring & Testing Software
Digital Prototype Systems, Inc.
www.dpstele.com

Eigentech, Inc.
www.eigentech.com/eigentech

Frontline Test Equipment, Inc.
www.fte.com

Phonetics, Inc.
www.sensaphone.com

Network Security
Technologic, Inc.
www.tlogic.com/freedemo2

Servers/Software (Remote Access, Print)
Compatible Systems Corp.
www.compatible.com

Training/Certification Programs
ForeFront Direct
www.ffg.com

Magna Media Training Solutions
www.magnamedia.com

NCR Customer Education Serv.
www.ncr-trainus.com

UPS
American Power Conversion
www.apcc.com

Liebert Corporation
www.liebert.com

WAN/LAN Hardware
American Technology
www.atli.com

BATM CONNECTronix
www.connectronix.com

Lightwave Communications, Inc.
www.lightwavecom.com/nw

Protec Microsystems, Inc.
www.protec.ca

Western Telematic, Inc.
www.wti.com

Wireless Networking
Network Access Solutions
www.naswireless.com

REFURBISHED NETWORKING EQUIPMENT
The First Name in Second Source Networking Equipment
BUY, SELL, LEASE/RENT, TRADE
Routers, Hubs, Switches, Comm. Servers
CISCO
BAY NETWORKS, 3COM, ASCEND, LIVINGSTON, XYPLEX
*All trademarks are the property of their respective owners
Technical Support • Product Warranty • Aggressive Pricing
1-800-832-6539
FAX: 612-944-3534
VOICE: 612-944-3440
Email: sales@interlinkcom.com
http://www.interlinkcom.com
InterLink COMMUNICATIONS
7131 Shady Oak Rd, Minneapolis, MN 55344
#283 @ www.networkworld.com/infoxpress

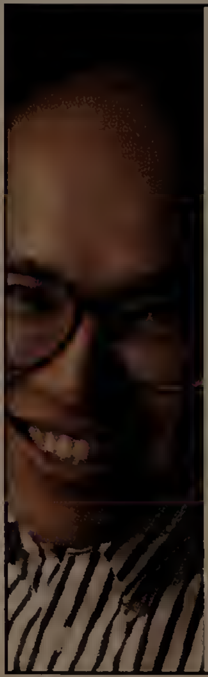
For details on how to put your ad here
Enku Gubaie
1-800-622-1108

CISCO
Systems/Features/Memory
CISCO EQUIPMENT
Also Available: Wellfleet, Bay, Fore, Xylogics, Livingston, & Ascend
In Stock • Fast Delivery • No Expedite Charges
COMSTAR, INC.
The #1 Network Remarketer
612•835•5502
Fax 612•835•1927 E-Mail:sales@comstarinc.com
#234 @ www.networkworld.com/infoxpress

Buy/Sell/Trade, New & Used
NETWORKING
Routers • Switches • Hubs
CISCO, BAYNETWORKS, CABLETRON
ASCEND FORE 3COM CHIPCOM
Visit Our WEBSITE @ www.bizint.com
NY Office/Sales:
Tel: (315) 458-9606
Fax: (315) 458-9493
International Resellers of Routers, Switches & Hubs
BIZI
Main Office:
Tel: (978) 667-4926
Fax: (978) 663-0607
#219 @ www.networkworld.com/infoxpress

NETWORKING PRODUCTS
LANS MUXES CSU/DSU Modems Routers
FIBERMUX • CABLETRON • CISCO
3COM • ASCEND • SHIVA
AT&T PARADYNE • US ROBOTICS
MICROCOM • ADTRAN & ADC KENTROX
BUY USED ✦ SELL REFURBISHED
CALL BOB GLICK
818-366-1374 • Fax: 818-366-5274
FIBERCOM
VISIT US ON THE WEB: www.fibercom.net
#269 @ www.networkworld.com/infoxpress

LAN/WAN • BUY/SELL
MODEMS FULLY WARRANTEED
DSU/CSU's NEW/REFURBISHED
T-1 EQUIPMENT RENTAL
SWITCHES, MUXES LEASE
HUB, BRIDGES, ROUTERS, ETC.
Cabletron Bay Networks
CISCO SPECIALISTS
3Com Micom Adtran H/P
We carry all manufacturers, call ask for sales.
http://www.adcs-inc.com
PHONE
800-783-8979
FAX (916)
781-6962
ADCS INC.
#240 @ www.networkworld.com/infoxpress



Bay Networks
The Merged Company of SynOptics and Wellfleet
CABLETRON SYSTEMS
Cisco Systems
3Com
Novell. Gold Partner
MADGE
We Stock the Largest Inventory of Refurbished Bay Networks in the World!
- Bay Networks ESP Trained
- Bay Networks Authorized
- Full Product Line
- New & Used, Buy & Sell
- Proven Track Record
- Good As New Warranties
- Repair Services Available
- Technical Support

National LAN Exchange
NLE
888.891.4BAY (4229)
Phone 801-377-0074
Fax 801-377-0078
1403 W. 820 N. Provo, UT 84601
Visit us On the Web @ www.nle.com
C.O.D's Terms
Fast overnight delivery FedEx
#231 @ www.networkworld.com/infoxpress

USED CISCO DIRECT
1-888-89-CISCO

NETFAST
Save up to 80% on new/used:
➤ Routers ➤ Switches ➤ XDSL ➤ T1 CSU/DSUs
➤ ATM ➤ Fast Ethernet ➤ ISDN ➤ Frame Relay
Cisco Systems
WE BUY USED

➤ CISCO ➤ Lucent/Livingston ➤ Nortel/Boy Networks ➤ ADC Kentrox ➤ Xyplex
➤ Ascend ➤ 3COM/USRobotics ➤ Lorscom ➤ Cobletron ➤ Newbridge ➤ Adtron
➤ Porodyne ➤ Digitol Link ➤ Fore
➤ Motorolo ➤ Network Assoc. ➤ IBM

www.digitalwarehouse.com
DIGITAL WAREHOUSE
Your Information Superhighway Discount Source

Netfast Communications Inc., 56-29 56th Drive, Maspeth, NY 11378 USA
Phone: 1-888-892-4726 or 718-894-7500 Fax: 718-894-1573

#259 @ www.networkworld.com/infoxpress

USED
NETWORK HARDWARE
"Over 15 Years of Exceptional Service"
ROUTERS • HUBS • DSU/CSU
SWITCHES • TERMINAL SERVERS
BUY/SELL/LEASE
CISCO
ASCEND ▪ LIVINGSTON
ADTRAN ▪ KENTROX
Overnight Delivery: Fully Guaranteed
800-230-6638
805-964-1314 Fax: 805-964-5649
www.networkhardware.com
NETWORK HARDWARE RESALE, INC.

#244 @ www.networkworld.com/infoxpress

For More
Information About
Marketplace
1-800-622-1108

TRAINING
DIRECTORY

Certified NetAnalyst
(800) 645-8486
WWW.PINEMOUNTAINGROUP.COM
Protocol & Analyzer Training
Sniffer, Fluke, HP, Shomiti

Lanop Nat'l Test Prep
(800) US NETWORK
www.lanop.com
MCSE/CNE Certification
Guarantee to Pass All Tests 1st time

CrossTec's NetOp School SW
(800) 675-0729
www.CrossTec.Net
Six essential tools for the networked classroom. Download a Free Eval

NCR Customer Education
(800) 845-2273
www.ncr.com/trainus
Cisco, MCSE, NT & Networking, Training

Dalhousie University
(902) 494-1114
www.dal.ca/internetworking
Master Degree in Internetworking
One Year Program

SecureIT
(888) 777-4313
www.secureit.com
Test Your Security Knowledge!
Certified Security Training.

ForeFront Direct
(800) 475-5831
www.ffg.com
Computer based training for the I.T. industry

Transcender Corporation
(615) 726-8779
www.transcender.com
MCSE, MCSD, MCP Exam Simulations

Contact these companies today to help you with your training needs!

#257 @ www.networkworld.com/infoxpress

BUY, SELL OR ANNOUNCE
Network Products and Services
with *Network World's* Marketplace
Call 800-622-1108 ext. 7507

Livingston US Robotics
Ascend Micom
CISCO, BAY NETWORKS, CABLETRON, SYNOPTICS,
Specialist in all Cisco products including Memory
LAN/WAN Products
New, Used, Lease, Rent
3Com Codex
Adtran Xylogics
Motorola Wellfleet
We carry all Manufacturers
Millennium Solutions Group, Inc.
•Routers, Bridges •Frame Relay
•DSU/CSU's •Hubs, Modems
•Switches, ATM •Voice over Data
We Buy and Sell
888-801-2001 Fax (916) 797-9997
Visit our Web Site at:
http://www.millenniumsolutions.net

#293 @ www.networkworld.com/infoxpress

NORTEL NETWORKS
"We'd like to cut costs by combining voice, fax and data on our network. But we also want toll-quality voice and instant data access."
"That's precisely what we wanted. And we got it with ClearVoice technology. Now our network gives us the best of both worlds."
ClearVoice* is a remarkable digital compression technology that adds toll-quality voice and fax to your existing frame relay or routed IP network. Intra-company phone calls and faxes ride free along with other LAN and WAN traffic. What's more, ClearVoice takes only a fraction of your network's throughput, so there's no need to add extra bandwidth. Call or e-mail today to receive Nortel Networks' free ClearVoice white paper and get the full story.
Free ClearVoice Over Frame Relay White Paper Offer!
DSC
Datacomm Support Company Inc.
1020 Calle Cardillera, Suite 103, San Clemente, CA 92673 Tel: (800) 388-8953
E-Mail: sales@dscwan.com Website: www.dscwan.com/Reg/SpecialsMain.htm

#319 @ www.networkworld.com/infoxpress

4LANWAN.COM
Purveyors of Networking Hardware
NEW & USED
Switches, Modules, Routers, Hubs & More
Cisco Systems
Proteon
SynOptics
SMC
3Com
WORLD'S LARGEST SUPPLIER
NEW / USED 3 COM PARTS
US Robotics
Bay Networks
Cabletron Systems
intel
Chipcom
BUY & SELL
Quantity, Reseller, Government & Education, Discounts available.

LOWER PRICES THAN THOSE WAREHOUSE GUYS!
+ Lowest Prices on Factory Fresh Equipment
+ Up to 90% OFF Retail for Refurbished Items
+ Huge Inventory of Legacy Products
GIANT INVENTORY
+ Factory Trained Consultants on Staff
+ Authorized Service Center
HUGE DISCOUNTS
+ We Also Do Repairs & Exchanges
+ Same Day Shipping on Most Items
+ Same Day Delivery Via Counter Service
Fax us Your Want to Sell / Buy Lists @ 516-293-5325

Visit our Web Site with On-Line Shopping & Auction @ WWW.4LANWAN.COM
A Division of Ergonomic Enterprises, Inc.
ONE YEAR WARRANTY ON ALL USED EQUIPMENT
CALL TOLL FREE: 1-877-4LANWAN
International Calls: 001-1-516-293-5200 / E-mail: Sales@4LANWAN.COM
VISA
C.O.D.
Net Terms
WWW.4LANWAN.COM, Inc.
A Division of Ergonomic Enterprises, Inc.
47 WERMAN CT. PLAINVIEW, NY 11803
logos are registered trademarks of the companies they represent
OUR 16TH YEAR

#271 @ www.networkworld.com/infoxpress

Cabletron Equipment
GUARANTEED
IN-STOCK OVER 20,000 UNITS READY TO SHIP
• 100% factory refurbished
• Only factory-authorized VAR
• 30 day hot swap, 1 year free repair
• We also carry: Bay Networks, 3Com, Compex, Cisco & more!
888-663-3313
VNETEK COMMUNICATIONS, LLC
Vnetek Communications, LLC
sales@vnetek.com • www.vnetek.com
Brand names are registered trademarks.

#260 @ www.networkworld.com/infoxpress

Made in U.S.A.
Solve
Ethernet
Distance
Limitations with Fiber! (800) 894-9694
(CONVERT: COPPER <-> FIBER)
DESCRIPTIONS:
10BASE-T - 10BASE-FL Converter*
AUI - 10BASE-FL Fiber Optic Transceiver
AUI - 10BASE-T Transceiver
100BASE-TX - 100BASE-FX Converter*
SM-MM Converters & Repeaters Available*
*20 Unit Rack Mount Available
Switches, Fiber & CAT 5 Products
www.fiberdyne.com
FIBERDYNE LABS, INC.
127 Business Park Dr., Frankfort, NY 13340
Tel. (315) 895-8470 Fax (315) 895-8436
FACTORY DIRECT SAVINGS

#291 @ www.networkworld.com/infoxpress

Network World, Inc.

Colin Ungaro, President/CEO
Evilee Thibeault, Senior Vice President/Publisher
Mary Kaye Newton, Assistant to the President
Eloni Brisbnis, Senior Sales Associate

FINANCE
Mary Fanning, Vice President Finance
Paul Mercer, Finance Manager

HUMAN RESOURCES/ADMINISTRATION
Monica Brunaccini, VP of Human Resources/Admin.
Danielle Caldwell, Sr. Human Resources Representative
Frank Coelho, Office Services Manager
Lisa Smith, Telecommunications/HR Coordinator
Tom Garvey, Mailroom Supervisor
Mark Anderson, Mailroom Assistant

MARKETING
Hillary Freeley, Director of Marketing
Jim Grisanzio, Public Relations Manager
Kristin Wattu, Marketing Communications Manager
Barbara Sullivan, Sr. Marketing Research Analyst
Donna Kirkey, Marketing Design Manager

GLOBAL PRODUCT SUPPORT CENTER
Nancy Parquette, Event Planner
Cindy Panzera, Marketing Specialist

ADVERTISING OPERATIONS
Karen Lincoln, Director of Advertising Operations
Ann Jordan, Supervisor of Advertising Operations
Kris Guay, Direct Response/Recruitment Ad Coordinator

PRODUCTION
Ann Finn, Production Director
Greg Morgan, Senior Production Supervisor
Marlo Matoska, Print Buying Supervisor

CIRCULATION
Sharon Smith, Senior Director of Circulation
Richard Priante, Director of Circulation
Christine Rhoder, Circulation Marketing Manager
Bobbie Cruse, Subscriptions Manager
Mary McIntire, Circulation Coordinator

RESEARCH
Ann MacKay, Research Director

DISTRIBUTION
Bob Wescott, Distribution Manager/(508)879-0700

IDG LIST RENTAL SERVICES
Elizabeth Tyle, Sales Representative
P.O. Box 9151, Framingham, MA 01701-9151
(800) 343-6474/(508) 370-0825, FAX:(508) 370-0020

PROFESSIONAL DEVELOPMENT GROUP
William Reinstein, Senior V.P./Business Development
Steven Engel, General Manager Seminars & Events
Andrea D'Amato, Sales Manager/Strategic Partnerships
Debra Becker, Senior Marketing Manager
Christie Combs, Finance/Operations Manager
Peter Halliday, Product Manager/NetDraw
William Bernardi, Senior Event Planner
Maureen Whiting, Senior Marketing Specialist
Kristin Ballou, Account Executive
Betty Amaro, Finance/Operations Analyst
Jill Keaveney, Event Planner
Tim DeMeo, Customer Service Representative
Tricia Fiscale, Sales Assistant

ONLINE SERVICES
Ann Roskey, Director, Online Services
Jean-Olivier Holingue, Director of Technology
Clare O'Brien, Online Sales Manager
Dan Chupka, Online Account Executive
Pam Kerensky, Online Database Manager
Andrea Duksta, Senior Web Producer
Karen Avedian, Sales Operations Analyst
Jolene Springfield, Sales Operations Analyst
Christine Rhoder, Circulation Marketing Manager
Nadar Fakhraie, Web Engineer
FAX:(508) 270-8869

INFORMATION SYSTEMS/IMAGING SERVICES
Michael Draper, Vice President Information Systems
Rocco Bortone, Network Manager
Kevin O'Keefe, Systems Manager
John Chambers, Groupware Technologist
Anne Nickinello, Senior Manager, Imaging Services
Deborah Vozikis, Senior Imaging Specialist
Sean Landry, Imaging Specialist

IDG

Patrick J. McGovern, Chairman of the Board
Kelly Conlin, President
Jim Casella, Chief Operating Officer

Network World is a publication of **IDG**, the world's largest publisher of computer-related information and the leading global provider of information services on information technology. IDG publishes over 275 computer publications in 75 countries. Ninety million people read one or more IDG publications each month. *Network World* contributes to the IDG News Service, offering the latest on domestic and international computer news.

NetworkWorld

EDITORIAL INDEX

3Com 1,19
A
Alcatel 8
America Online 6
Apple 15
Arial Systems 78
Ascend 8
AT&T 1,34
C
Centrax 60
D
Dell 19
F
F5 38
FaxSav 31
Fenestrae 31
Frontier 14
G
Global Crossings 14
Global One 31
I
Idiom Technologies 78
Infoliant 37
Intel 6
Isode 37
L
Lucent 1
M
Marimba 59
Microsoft 6,19,37
Multi-Tech Systems 63
N
NEC 6
Netscape 6
Nortel 24
O
Oblix 10
R
Redstone Communications 6
Remedy 37
S
Savvis Communications 31
Siemens 6
Sony 46
V
Vinca 19

ADVERTISER INDEX

Advertiser	Reader Service#	Page#	URL
3Com		4	www.3com.com
ADC Kentrox Industries	73	9	www.kentrox.com
American Power Conversion	55	24-25	www.epcc.com
AT & T		55	www.att.com
Borderware Technologies Inc	77	44	www.borderware.com
Castle Rock Computing	252	67	www.castlerock.com
Checkpoint Software, Meta IP Group	75	42	www.metaip.checkpoint.com
CICAT Networks	303	71	www.telcoexpress.com
Compeq Computer Corp		52	www.compaq.com
Computer Associates	68	36	www.cai.com
CrossTec Corp	56	58	www.4ctc.com
Evans Consoles	324	67	www.econsole.com
Extreme Networks	69	13	www.extremenetworks.com
Fore Systems	70	56	www.fore.com
ForeFront Direct Inc	237	71	www.ffg.com
Foundry Networks	71	29	www.foundrynet.com
Fujitsu	72	32	www.oetprism.com
*Genicom Corp	57	49	www.genicom.com
Hewlett Packard		19, 30	www.hp.com
IBM		7, 40-41, 79-82	www.ibm.com
Intel Corp		26-27	www.intel.com
Interlink Computer Sciences	316	69	www.interlink.com
Kansmen Corp	298	70	www.kansmen.com
Lancast		10	www.lancast.com
Lantronix	74	15	www.lantronix.com
Lastar Oetacomm Solutions	315	70	www.iastar.net
MCI/Worldcom	78	35	www.mciworldcom.com
Microsoft Corp		16-17	www.microsoft.com
NetSolve	59	22	www.netsolve.com
Network Instruments	290	70	www.networkinstruments.com
Nortel	60	45	www.nortelnetworks.com
Olicom	61	39	www.olicom.com
Platinum Technologies	62	62	www.platinum.com
QMS Inc	63	34	www.qms.com
Racal	64	46	www.racal.com
RAD Data Communications	65	63	www.rad.com
Raritan Computer	314	68	www.raritan.com
Sprint		43	www.sprint.com
Teleswitch Corp	321	67	www.teleboot.com
Timeplex Group	239	70	www.timeplex.com
Toshiba America Inc	76	2-3	www.networks.toshiba.com
Unisys Corp		23	www.unisys.com
*US West	66	61	www.uswest.com
Visual Networks Inc	67	11	www.visualnetworks.com
Western Telematic Inc	250	68	www.wti.com
Xerox Corp	79	20-21	www.xerox.com

Network World Fusion – www.nwfusion.com

3COM
3M-Telecom Systems Division/Valition
Adaptec, Inc.
Allot Communications
AXENT Technologies
Cabletron Systems, Inc.
F5 Labs
GTE Internetworking
Intraware
Larscom Incorporated
Make Systems
N.E.T.
NetSolve
Pacific Bell
Ripple Technology
Southwestern Bell
Sterling Software
Symantec
VeriSign
Visio Corporation
Visual Networks
Wavespan
Xircom
Nortel (2)

These indexes are provided as a reader service. Although every effort has been made to make them as complete as possible, the publication does not assume liability for errors or omissions.

*Indicates Regional/Demographic

Sales Offices

Carol Lasker, Associate Publisher
Internet: clasker@nww.com
Debbie Lovell, Senior Sales Associate
(508) 875-6400/FAX:(508)879-5760

NEW YORK/NEW JERSEY
Tom Davis, Advertising Director/Eastern Region
Elisa Della Rocco, District Manager
Internet: tdavis, elisas@nww.com
Aimee Jacobs, Sales Assistant
(201) 587-0090/FAX: (201) 712-9786

NORTHEAST
Donna Pomponi, Senior District Manager
Kevin Gasper, District Manager
Michael Eadie, Account Executive
Internet: dpomponi, kgasper, meadie@nww.com
Linda Bishop, Sales Assistant
(508) 875-6400/FAX: (508) 879-5760

MID-ATLANTIC
Jacqui DiBianca, Senior District Manager
James Kalbach, Account Executive
Internet: jdibian, jkalbach@nww.com
Rebecca Showers, Sales Assistant
(610) 971-1530/FAX: (610) 975-0837

MIDWEST/MARYLAND
Eric Danetz, District Manager
Aimee Jacobs, Sales Assistant
(201) 587-0090/FAX: (201) 712-9786

CENTRAL
Dan Gentila, Midwest Regional Manager
Internet: dgentile@nww.com
Kristin Ashton, Sales Assistant
(512) 249-2200/FAX: (512) 249-2202

NORTHWEST
Sandra Kupiec, Advertising Director/Western Region
Carol Stiglic, Senior District Manager
Susan Rastellini, District Manager
Sarah McGregor, District Manager
Lara Greenberg, District Manager
Internet: skupiec, cstiglic, slr, smcgrego,
lgreenbe,kmarceau@nww.com
Katherine Marcaau, Sales Operations Manager
Javiera Garcia, Sales Assistant
Mark Hiatt, Sales Assistant
(408) 567-4150/FAX: (408) 567-4166

SOUTHWEST
Amy C. Bartulis, Senior District Manager
Internet: abartuli@nww.com
Becky Bogart, Account Executive
(949) 250-3006/FAX: (949) 833-2857

SOUTHEAST
Don Seay, Senior District Manager
Internet: dseay@nww.com
Terry Sanders-Prentice, Sales Assistant
(770) 394-0758/FAX: (770) 394-6354

DIRECT RESPONSE ADVERTISING
Response Card Decks/Marketplace

Kim Norton, Director of Direct Response
Richard Black, Sr. Account Manager
Enku Gubaie, Account Manager
Sean Weglage, Account Manager
Kathryn Zinn, Account Manager
Internet: knorton, rblack, egubaie, sweglage, kzinn@nww.com
Sharon Chin, Sales/Marketing Operations Manager
Chris Gibney, Sales Assistant
(508) 875-6400/FAX: (508) 628-3976

RECRUITMENT ADVERTISING

Dodi Rabinovitz, Senior Recruitment Director
Carla Cappucci, Marketing/Sales Coordinator
Sandy Weill, Account Executive
Karima Zannotti, Account Executive
Internet: drabinov, ccapp, jparkar, kzannott@nww.com
(508) 875-6400/FAX: (508) 820-0607

NetworkWorld TECHNICAL SEMINARS

Network World Technical Seminars are one and two-day, intensive seminars in cities nationwide covering the latest networking technologies. All of our seminars are also available for customized on-site training. For complete and immediate information on our current seminar offerings, call a seminar representative at 800-643-4668, or go to www.nwfusion.com/seminars.

NetDraw® Plus

Create network diagrams, proposals and presentations fast and easily with *Network World's* NetDraw and NetDraw Plus software. At your fingertips, you will find over 2,000 full color network images, many the complete likeness of your network equipment. Now it's easy to attach text files, Word documents, other programs, or even Web hyperlinks directly to images. You can even embed your finished diagrams directly into Microsoft Office documents. Go to www.netdraw.com to download your free, 30-day trial of this extremely easy-to-use product today. Call 800-643-4668 to order a copy for only $149!

Publicize your press coverage in *Network World* by ordering reprints of your editorial mentions. Reprints make great marketing materials and are available in quantities of 500 and up. To order, contact Reprint Services at 612-582-3800 or 315 5th Ave. N.W., St Paul, MN 55112.

Patents,
continued from page 1

targets have been asked for up to 6% of their entire product revenue.

Lucent's aggressive tactics have resulted in epic patent lawsuits against competitors such as Cisco and Newbridge Networks. But *Network World* has also learned that some Lucent rivals are turning the tables, claiming in court documents that Lucent has engaged in unfair competition by trying to collect royalties on ATM, frame relay and voice-coding technologies only after they became industry standards and are widely deployed.

Lucent lawsuits demand that competitors pay not only royalties but also damages for robbing Lucent of product sales.

Court documents also reveal that Lucent attorneys have fought against demands for depositions that would force the company's executives to state exactly which of Lucent's data products have been hurt in the marketplace by competitors allegedly infringing on Lucent patents. And when those depositions have taken place, Lucent officials have had to admit they failed to implement their company's inventions for years at a time — and then have had to employ OEM agreements and acquisitions to enter key markets.

"What does Lucent own other than PBXs that has any kind of prominence in the [enterprise] market?" asks Howard Anderson, president of The Yankee Group, a consultancy in Boston. "Lucent would have liked to have been a Bay Networks, but it never was."

As a result, he says, Lucent is wielding its patent portfolio as a club while it assembles its data-network portfolio. "It regards these patents as large bargaining chips to cross-license what it doesn't have, and sometimes to mount some rather formidable barriers against competition."

Lucent officials insist they are not making royalty demands because the company's data-network product efforts are just getting underway.

But Lucent's targets are angry.

The Upshot

Lucent has asked hundreds of vendors to pay royalties or other compensation for using Bell Labs patents. And the company has sued several competitors that have refused to pay. In return, those vendors say Lucent is abusing standards groups by failing to disclose patents they hold until after standards are approved. Lucent says it's happy to license its technology to all comers.

"I think this shows the mentality of how Lucent operates," says Daniel Scheinman, Cisco's vice president of legal and government affairs. "It missed the whole Internet thing, and now it's trying to apply old patents in a broad way." He calls the process a "shakedown."

Sniffing out offenders

Lucent officials acknowledge — and even boast — that they will do what it takes to protect their patent rights. The company spends 11% of its $30.1 billion annual revenue on research and development, and its U.S. patent portfolio, built on a base of Bell Labs inventions, now reaches nearly 10,000.

"We spend a fortune on technology," says Michael Greene, chief operating officer of Lucent's Intellectual Property group, which employs some 300 people. "All we are saying is: If others want to use [a patented technology], we would be pleased to allow them to use it — for a payment."

With so much at stake, Greene and his group have developed a highly choreographed method of targeting other companies, some of it modeled on legendary past patent enforcers IBM and Texas Instruments.

First, Greene's group assigns baskets of patents to individual Intellectual Property managers. These officials — and sometimes other Lucent employees outside the business unit — scour the World Wide Web, visit trade shows and seek out other forums in search of possible violations of Bell Labs technology. They funnel all that information to the so-called Patent Assertion Team, headed by corporate counsel Maurice dePicciotto, whose staff decides on the most promising opportunities for patent claims.

The target company then gets a letter asserting Lucent's patents and asking the company to agree to a license. If the target company doesn't agree, the case is turned over to a licensing team, headed by Lucent coporate counsel Donald Padilla, which then opens negotiations. The licensing team is headed by Lucent corporate counsel Donald Padilla.

"It's not a short process," dePicciotto says.

Negotiations can drag on because Lucent won't settle for a cross-license if it's royalty-free to both sides. Lucent officials say they will only cross-license if there's a fee attached to each side's technology exchange, and Lucent's fee is larger. What if the other company comes out ahead in the cross-licensing talks?

"Horrors!" Padilla says. "Because of the significance and quality of our patent portfolio, the balance is almost always in our favor."

Some Lucent competitors say existing cross-licensing agreements are being shoved aside.

"They have notified us that they do not intend to renew certain relationships," says Fred Fromm, president of Siemens Information and Communication Networks, a big PBX vendor that's now entering the data market. Fromm says he isn't worried: "We'll discuss it with them because cross-licensing goes in two different directions."

Cross-licensing aside, big and small companies have been targeted by Lucent's patent managers, says one West Coast venture capitalist who asked not to be identified.

"I don't understand why [Lucent is] doing this," the source says. "It's stance seems to be: The first thing we're going to do is shut the world down and then come back and negotiate."

DePicciotto maintains that Lucent only approaches certain start-ups.

Other industry sources confirm that's the case.

"[Lucent] wants to wait and see if you're successful or not," says Gary Andresen, a former Dataquest analyst and now vice president of marketing at StarVox, a voice-over-IP vendor in San Jose. "Why should they [mess] with someone who has no money?"

Besides, intellectual property is a profit source for Lucent, says The Yankee Group's Anderson: "They monitor these people in terms of 'How much money did you collect for us?' "

Only the best

But sometimes Lucent can't collect any money quickly because the target company denies it's using any Bell Labs technology or claims that Lucent's patents don't apply to their products. Then it's off to court. Lucent has sued at least seven vendors, including PC makers and internetwork and voice-processing vendors. And at least once has Lucent been sued by a competitor first.

When in comes to litigation, Lucent uses some of the heaviest legal artillery available. One of its primary law firms is Kirkland & Ellis, a 537-lawyer behemoth with offices in New York, Chicago, Los Angeles and Washington, D.C.

But the firm is best known for defending tobacco companies against liability claims and for its most famous partner, Independent Counsel Ken Starr. An online career-help service for law students, Vault Reports, credits Kirkland & Ellis with "a top-notch litigation department" and a "hard-ass reputation." Lucent also employs several other law firms, especially in Delaware and Pennsylvania, where most of its cases are filed.

The major cases have followed a distinct pattern. In June 1997, Lucent sued Newbridge, alleging that Newbridge's MainStreet multiplexers and ATM switches violated four Bell Labs patents.

Lucent alleged that the Newbridge multiplexers included: two 1988 Lucent inventions specifying congestion control in packet networks; a 1990 Lucent patent specifying error-correction methods; and a 1984 patent describing Adaptive Differential Pulse Code Modulation (ADPCM), a common method of encoding voice into 32K bit/sec digital streams.

About a year later, Lucent sued Cisco, alleging violations of the same four patents, plus four more. But unlike the Newbridge case, the Cisco case spun out of control.

First Cisco countersued, claiming that Lucent ATM products violated recent inventions used in Cisco's Stratacom ATM switches.

Then Cisco filed its own suit in U.S. district court in San Jose, claiming that Lucent

See **Patents**, page 76

> **"We spend a fortune on technology. . . . If others want to use [a patented technology], we would be pleased to allow them to use it — for a payment."**

STEVE SKOLL

Michael Greene, chief operating officer of Lucent's Intellectual Property group

Patents,
continued from page 75

was stealing some of its LAN and network-management technology. Finally, Lucent added a Gigabit Ethernet company it had bought as a new plaintiff in the case.

Industry experts are amused and alarmed by the escalating warfare. Their concern: The congestion-control and voice-coding technologies involved in the lawsuits were deployed by so many vendors over a period when Lucent's predecessor, AT&T, did not aggressively assert its patent rights for ADPCM and other technologies.

"That's a good one," says Peter Bernstein, president of Infonautics Consulting in Ramsey, N.J. If Lucent wins that case against Newbridge, many other vendors could be targeted for possible patent problems.

"The line gets real long," he says.

Cisco's Scheinman claims that was the goal.

"Their strategy was: Assert patents against Newbridge, win against Newbridge, and then shake down the entire industry," he says. Another Lucent antagonist who asked to remain anonymous agreed: "I think that Lucent thought it was going to knock off Newbridge and then foist royalties on everybody else in the industry."

Ballooning case

Most patent-infringement lawsuits involve one or two patents. The court battle between Lucent and Cisco involves 24.

A cut of the revenue

Like Newbridge, Periphonics Corp., a Bohemia, N.Y., maker of voice-response systems, has had its share of legal conflicts with Lucent.

According to Periphonics' court papers, Lucent in 1997 wrote to Periphonics charging that it was infringing on 10 Lucent patents. Periphonics then met several times with Lucent officials and denied the charge.

But "Lucent refused to discuss the merits of Periphonics' arguments," wrote Periphonics attorney James Mulligan. "Instead, Lucent demanded a 6% royalty on all product revenue that Periphonics earns, regardless of how it may relate to any of the 10 patents."

According to Mulligan, Lucent then warned that even if Periphonics' arguments about those patents held up, "it eventually would find [other] patents that Periphonics infringed." Finally, Lucent sued Periphonics in July 1998 in a case that's still pending.

Lucent's Greene says a demand for 6% is "on the high side" among the company's

PATENTS FOR PROFIT

licensing negotiations. But industry insiders say that's often what's put on the table. "That's pretty typical of what I see," The Yankee Group's Anderson says. And for some companies, those demands can be scary.

"That's probably the profit of some companies, if they are lucky. Lucent is being predatory, I think," StarVox's Andresen says.

In the face of those demands, many companies are throwing in the towel.

"There are tons of companies that have been settling," says Frank Dzubeck, president of Communications Network Architects, a consultancy in Washington, D.C.

Dzubeck adds that the settlement is often for much less than the original demand.

But some firms that have settled prior to a lawsuit or just before trial have been forced to take charges against earnings or acknowledge cash payments to Lucent. Call center vendor Aspect Telecommunications took a $14 million hit. Voice-messaging vendor Centigram paid $9.2 million. Voice-response/customer-service software vendor Edify wrote off $5 million.

More settlements are almost certainly on their way, because most patents run either 17 years from the date they were approved or 20 years from the date they were submitted, even if the technology subsequently improves.

"If I invent a pencil and get a patent on it for 17 or 20 years, and you come along and invent an eraser, you can get a patent on the pencil and eraser," Lucent's Padilla says. "But you still can't make the pencil without coming to me."

Some experts say it isn't that simple. Lucent's claim of ownership for ADPCM is actually incorporated in the International Telecommunication Union's (ITU) G.726 voice-compression and encoding standard, says Brough Turner, senior vice president for technology at Natural Microsystems, a Framingham, Mass., maker of Digital Signal Processor chipsets and computer-telephony software.

And at least 11 parties, including Lucent, claim ownership to some part of follow-on standards that improve voice compression, he says.

"We don't want to have anyone coming to us with a patent from 1982 that just sat around and they never did anything with it," Andresen adds. "If it was so good, why didn't you take the technology and use it yourself?"

Into the fray

Cisco and Prominet were involved in cross-licensing negotiations until Lucent bought Prominet. Then Prominet sued Cisco.

Now you tell us

Some of Lucent's antagonists raise other questions about standards. For example, the two congestion-control patents that Lucent claims Newbridge and Cisco are violating were awarded in September 1988. They have proven key to the development of ATM and frame relay in the 1990s.

But it was not until September 1996 that Lucent officially disclosed to the ATM Forum that it held these two patents. In letters available on the ATM Forum's Web site, Lucent said it was not prepared to waive its rights to these patents, adding that they related to two ATM Forum standards: User-Network Interface 3.1 and Traffic Management 4.0.

The problem: Both these standards were already finalized — UNI 3.1 in 1994 and TM 4.0 in 1996.

And other companies have generally posted patent assertions while standards were still being considered.

"That's a no-no as far as I'm concerned on Lucent's part," says Mary Petrosky, an independent technology analyst in San Mateo, Calif. Asserting patents so late in the game "is a hardball method for one vendor to distract a competitor, to slow down a vendor or just suck money out of them through the legal fees," she says.

Cisco and Newbridge lawyers also cite a May 1996 antitrust consent decree between the Federal Trade Commission and Dell regarding a standard called VL-Bus. The FTC charged that Dell began asserting a 1991 patent on that technology only after the PC industry had shipped 1.4 million units using the approved VL-Bus specification.

The FTC ruled that Dell "unreasonably restrained competition" by forcing rival manufacturers to "delay their use of the design standard until the patent issue was clarified."

Now Newbridge lawyers are leveling the same accusation against Lucent. In court papers, they say Lucent misused the procedures of not only the ATM Forum but also the Frame Relay Forum, ITU and American National Standards Institute.

Lucent "abused the standard-setting process by failing to disclose Lucent's alleged proprietary position on a proposed or adopted standard," and then "tried to extract anticompetitive royalties from those relying on the standards."

Lucent officials heatedly deny the charge. Lucent's

See **Patents**, page 77

Seeking a day in court

A sampling of Lucent's patent-infringement lawsuits:

Lucent opponent	Date Lucent suit filed	Date other company's countersuit filed	Number of total patents involved	Key technology issues	Case status
Acer Taiwanese PC manufacturer	June 1997	No countersuit	Eight	Video, audio and speech encoding; plasma etching	Settled out of court October 1998
Aspect Call center vendor	March 1997	November 1997	11	Call center routing; call screening; computer-telephone integration	Settled out of court March 1998
Cisco	June 1998	August 1998	24	ATM and frame relay congestion control plus error detection and correction; digital voice coding for TDM and ATM networks; hot-swap circuitboard initialization; network security	Trial scheduled for November 1999
Newbridge	June 1997	October 1997	Four	ATM and frame relay congestion control plus error detection and correction; digital voice coding for TDM and ATM networks	Trial expected by summer 2000

Patents,
continued from page 76

Greene says that long before September 1996, the company told the ATM Forum and other groups that as a general practice Lucent would be happy to license any of its patents, even if the company did not specify which ones could affect which standards.

(*Network World* several times requested copies of that correspondence, but Lucent did not produce any documents by press time.)

"We've got 10,000 patents," says Greene, visibly annoyed. "I'm not going to spend my time determining the five of them that might affect a standard. Why should I do that? If it develops that we have patents that affect that standard, we'll license it on fair and reasonable terms."

The big guns

Lucent uses Ken Starr's law firm as its principal litigator against companies that don't agree to technology licenses.

What's more, in the Dell case, the FTC claimed Dell specifically denied that it had patents affecting the VL-Bus standard just as it was being approved. "[Any decision] turns in large part on intentional activities of the patent owner," Lucent's Padilla says.

"To hide it and then come out later and assert that is not something that we would ever do," he insists.

Newbridge lawyers claim that Lucent has been less than forthcoming with one key piece of information: how much revenue the company would have really lost due to patent infringement.

"We have a right to know what Lucent and AT&T produced at the time of these alleged inventions," Newbridge lawyer Ed Foote said at a pretrial hearing.

"What is the factual basis for their infringement case? What are the products that they manufacture that supposedly incorporate this technology?"

Lucent lawyers have even blocked testimony by Lucent's data-product chief to answer these questions.

Portions of depositions made publicly available show other Lucent officials struggling with this issue. In one deposition, Foote asked Lucent official Kenneth Clark what products AT&T or Lucent had produced since 1984 that perform ATM switching.

Clark said the first product he could think of was Globeview 2000, an ATM core switch that first made money in 1993. Clark also mentioned the PacketStar ATM core switch, which was introduced more recently.

"And then we have a few products since 1996 that we have OEM'd that have ATM capability," Clark added.

These depositions have become so sensitive that at one point in open court an argument broke out in which Lucent's lawyer called Newbridge's lawyer a liar. The judge attributed the argument to stress between the parties because the stakes are high.

JASON GROW

"This shows the mentality of how Lucent operates. It missed the whole Internet thing, and now it's trying to apply old patents in a broad way."

Daniel Scheinman, Cisco's vice president of legal and government affairs

Perhaps that's one thing on which everyone agrees.

Lucent officials say they have 120 to 150 patent cases right now, while Cisco's Scheinman accuses them of "moving ahead rapidly and blindly to what they think is some sort of revenue pot."

In the struggle for dominance of the network world, there's no sign that Lucent is going to give up its claims that it invented much of what users employ today — whether or not it sports the Lucent logo. ◪

3Com,
continued from page 1

shift."

Channin spoke at a 3Com event to support the company's vision of converged networks. 3Com hosted Channin and a handful of other users to announce an alliance program to accelerate the deployment of voice/data/video convergence.

3Com's announcement, which includes partnerships with Microsoft, Siemens and Dell, comes the day after Nortel Networks announced a similar arrangement with Microsoft, Intel and Hewlett-Packard. 3Com says its program is not a response to the Nortel initiative, however.

"How could we do this in 24 hours?" asks Robert Roman, 3Com director of business development. "This is a response to a real market need."

But it's a need that doesn't appear to be too urgent. 3Com acknowledged that to date, none of its users has replaced circuit-switched PBXs with voice-enabled packet switches, such as 3Com's PBX 1000, which is based on the firm's SuperStack II LAN switch. 3Com's Roman attributed the slow uptake to users' existing investments in PBXs and the unproven reliability of data networks to support voice.

"You don't have a machine quite as reliable as the PBX," Roman says.

Channin says hopping on and off of the public switched telephone network from converged campus networks is one issue.

"Standards aren't there yet," and that hampers interoperability of packet-to-circuit gateways, he says. Nonetheless, Northwestern is looking at a packet-based voice infrastructure as a "red system," or backup phone system.

H.323 is regarded as the standard for multimedia over packet networks but, as with any standard, vendors can interpret and implement it differently. Therefore, interoperability testing of H.323-based products is key.

Other users say cost issues are involved with running voice over data. That is an interesting assertion considering that a driving force behind voice and data network convergence is reduced costs.

"For in-state service, you can't justify the cost yet," says Joe Bujek, director of IT for University Hospital in Denver.

Not there yet

Issues stalling voice/data convergence, according to 3Com users:

- Lack of standards
- Investment in and reliability of old telephone gear
- Equipment and service cost
- Budget constraints
- Complexity
- Vendor and user unfamiliarity

One 3Com user seems to be ahead of the convergence curve. Widener College in Chester, Pa., is running the conversations of 3,000 users on its Delaware campus over an ATM backbone, says Gary Habermann, director of network operations.

If the ATM network fails, they will be silent. "If the data network goes down, the voice goes, too," Habermann says.

Other users who are not as far along as Widener say some of their suppliers aren't yet conversant in convergence.

"Our application vendor doesn't have any idea of the network infrastructure," says Blake McClarty, professor and chair of the radiology department at Health Sciences Centre in Winnipeg, Manitoba. "Networking is secondary; they have very little knowledge. There's a tendency to install and blame."

Vendors say despite all of the perceived benefits of convergence — lower equipment and service costs, and new applications — coexistence of circuit and packet networks will be the norm for some time.

"I'm comfortable with a multimedia appliance with a telephone right next to it," says James Welch, vice president of systems, marketing and business development at software developer Protocol Systems in Beaverton, Ore. ◪

Get more info online.
DocFinder: 2319
www.nwfusion

Network World, 161 Worcester Road, Framingham, Mass. 01701-9172, (508) 875-6400

Periodicals postage paid at Framingham, Mass., and additional mailing offices. Posted under Canadian International Publication agreement #0385662. *Network World* (ISSN 0887-7661) is published weekly, except for a single combined issue for the last week in December and the first week in January by *Network World*, Inc., 161 Worcester Road, Framingham, Mass. 01701-9172.

Network World is distributed free of charge in the U.S. to qualified management or professionals.

To apply for a free subscription, complete and sign the qualification card in this issue or write *Network World* at the address below. No subscriptions accepted without complete identification of subscriber's name, job function, company or organization. Based on the information supplied, the publisher reserves the right to reject non-qualified requests. Subscriptions: 1-508-820-7444.

Nonqualified subscribers: $5.00 a copy; U.S. - $129 a year (except Washington, OC,$136.74); Canada - $160.50 (including 7% GST, GST#126659952); Central & South America - $150 a year (surface mail); Europe - $205 a year (surface mail), all other countries - $300 a year (airmail service). Four weeks notice is required for change of address. Allow six weeks for new subscription service to begin.

Please include mailing label from front cover of the publication.

Network World can be purchased on 35mm microfilm through University Microfilm Int., Periodical Entry Oept., 300 Zebb Road, Ann Arbor,Mich. 48106.

PHOTOCOPYRIGHTS: Permission to photocopy for internal or personal use or the internal or personal use of specific clients is granted by *Network World*, Inc. for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of $3.00 per copy of the article, plus 50 cents per page is paid to Copyright Clearance Center, 27 Congress Street, Salem, Mass. 01970.

POSTMASTER: Send Change of Address to *Network World*, P.O. Box 3090, Northbrook, IL 60065.

Copyright 1999 by *Network World*, Inc. All rights reserved. Reproduction of material appearing in Network World is forbidden without written permission.

Reprints (minimum 500 copies) and permission to reprint may be purchased from Reprint Services, 315 5th Ave. N.W., St.Paul, MN 55112 (612) 582-3800.

USPS735-730

Backspin

Oh, the manic magic in Gibbsland

I just got back from Disneyland, and you know what? The ol' Magic Kingdom ain't quite as magical as it used to be.

"What has happened to the magic?" you may be asking. "Have the Imagineers gone on strike?" No, dear reader, it is just that Disneyland and crass commercialism have had a head-on collision, and magic got squashed in the middle. You would need the Jaws of Life to pry magic's twitching corpse out of the wreckage, and even then it would have to go on life support.

Yep, at Disneyland, crass commercialism has advanced by an order of magnitude since my last visit. Disneyland has always been commercialized (sweat shirts for $65, for heaven's sake), but this year it was even more noticeable. For example, Eveready is sponsoring the Star Tours ride (you get about 60 feet of a "Still going" commercial in the exit passage), and a whole slew of vendors (including GM, Honeywell and, believe it or not, SAP) are shilling their wares in the rather lame and irritatingly named Innoventions pavilion.

MARK GIBBS

On the other hand, the Indiana Jones ride is pretty cool, and if it hadn't rained and stopped the ride, I would have been on the Rocket Rods in a flash. It's a Small World was closed, proving that there is a God, but evidence of the devil showed up in the vile menu choices and pricing in Disneyland's restaurants.

This all made me think: "What we need is the equivalent of Disneyland for IT professionals." So here's what the Gibbs Institute of Fun and Distraction plans to have as attractions at Gibbsland:

A big favorite with those who claim to be software engineers at heart and have the legal help and cash to defend that assertion, will be Chairman Bill's Wild Ride.

On this multimedia extravaganza, you will see the foundation and growth of a mighty software giant and witness the ecological changes wrought by a zealous government bureaucracy. You'll see a fight to the death as the bureaucracy shoots itself repeatedly in the foot while the Microsoft behemoth is savaged by the fierce parasitic life forms called lawyers. It will be a ride you won't soon forget.

Then there will be the Indiana Gibbs Adventure, Temple of the Forbidden IPO, in which you sit on a half-assed idea that transports you at high speed around a temple that looks a lot like the stock market. You'll scream with delight as venture capitalists throw money at you and feel a delicious tingle of fear as a giant rolling ball labeled "Microsoft" comes toward you. Will you survive? You'll have to get on the ride to find out.

In Markey's Toon Tech, you'll get to see inside the happy chaos of ICANN Mouse's house and, across the road, you'll laugh with sheer delight as you whirl around and around on InterNIC's Go Coaster. And look! Who's that in the Toon Tech Town Square? It is Nicholas Negroponte hawking comic Swatch watches that tell a meaningless time! Toon Tech will make you laugh till you want to vomit.

Of course, we will have that children's favorite, It's a Small Charge After All. In this charming, saccharin-loaded, pastel-colored display of death by minutia, telcos will bill you for small sums hidden inside mazes of charges, taxes and miscellaneous items layered behind third-party billing agencies and companies you've never heard of. You'll be charmed by the naiveté of it all and awed by the effectiveness of the scam. You'll leave befuddled and confused and find that it won't go away. Once visited, it will come back month after month until you want to scream. And you will.

What a magical place Gibbsland will be. See you there! (Opening Jan. 1, 1900)

Attraction suggestions to nwcolumn@gibbs.com or (800) 622-1108, Ext. 7504.

'NET BUZZ

PAUL MCNAMARA

Let's face the facts: "Workplace privacy" is an oxymoron, unless you telecommute *and* ship the kiddies off to boarding school.

Your office e-mail, Web surfing and telephone log are an open book. Heck, if the boss wants to see what's in your wallet or between your cheek and gum, he's going to take a peek, so stop rolling your eyes. Why, next thing you know, we'll all be wearing homing devices that track our every trip to the water cooler, cafeteria, or, horror of horrors, the porcelain reading room.

Say hello to **ArialView** from **Arial Systems, Inc.,** of Vernon Hills, Ill. The primary sales pitch of ArialView, which is on display at this week's Gartner Group symposium in San Diego, involves server/browser intranet software that helps service representatives get customers off "hold" and quickly connected to the right expert in your company.

Sounds useful, but the truly interesting part — or the truly **Big Brotherish** part, depending on your point of view — is the optional employee badge. These gizmos work in conjunction with a series of infrared sensors mounted every 400 feet within your building. When a badge wearer is needed but AWOL from his cubicle, ArialView pinpoints the wayward worker's location and enables an audio alert to be broadcast from the nearest sensor.

As in, "Hey, McNamara, put that pizza down and talk to Gates on Line 1!"

Just think of it as an electronic nag.

"Our system is valuable whether you use the badge or not," insists CEO Jim Alland, who doesn't need to be told it's the badge part that will give some the creeps. He's also convinced that reluctance will be short-lived once badge-ees start missing fewer important calls.

"Somebody once told me they don't like to be tracked," Alland says. "I don't like to be tracked either, unless it's damn important."

You haven't heard of him — yet — but Eric Silberstein's company, **Idiom Technologies, Inc.,** last week tied up a **$5 million start-up stake** from Greylock, Northbridge Venture Partners and a handful of private Internet dice rollers. These investors are betting that a 23-year-old CEO, less than a year out of Harvard, can parlay their cash into Internet riches by peddling software that helps companies translate English Web sites into foreign languages.

Based in Cambridge, Mass., Idiom's co-founders are Harvard classmates of Silberstein: Ken Shan, chief technology officer and Susan Cheng, vice president of marketing.

Five million clams to three young whippersnappers with cool code and a business plan: That's the Internet in nutshell. (Back when Buzz was that age, he was worried about getting a car loan.)

Silberstein says the idea for Idiom dawned during a summer stint as a software development manager for Microsoft in Beijing. (In college, Buzz worked a parking lot security detail. See a pattern yet?)

"It was clear to me that if there were three vendors selling widgets in China, the one that was selling it in the local language would be able to win," Silberstein told Buzz last week. It also became clear that current methods for "globalizing" Web sites are clunky and costly, so Silberstein and buddies set out to build their better mousetrap.

Soon venture capitalists were nibbling at the cheese.

"They've put together a fairly elegant solution that won't be easy to replicate," says Chip Hazard, a Greylock general partner.

Fine, but these three can barely buy beer.

"Young founders aren't necessarily a bad thing," Hazard insists. "The most important aspect of that equation is their willingness to bring in experienced, high-caliber people who can augment their skills and talents."

Nice to know the Internet world still needs grown-ups.

McNamara still needs your tips and ideas to fill this space every week. Contact him at (508) 820-7471 or pmcnamara@nww.com.

intel inside
pentium® II processor

thinkpad.show time

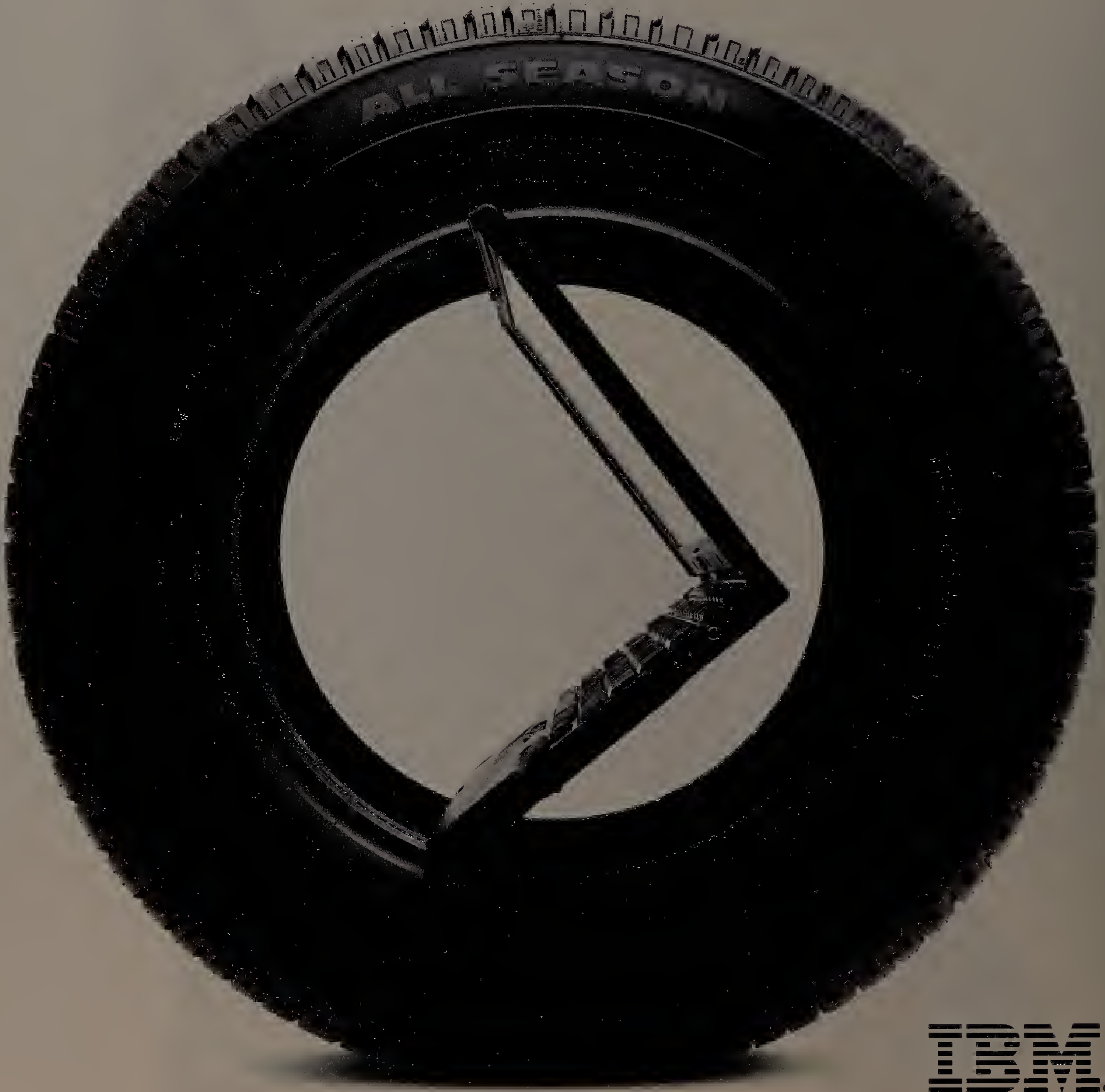
	media	power	bytes	price	workstation
ThinkPad® 770	14.1" active matrix display hot-swappable dvd SRS 3-D sound Dolby® Digital output	mobile Pentium® II processor 300 mhz 256kb level 2 cache	14.1gb hard drive 128mb memory	$4,899*	Windows NT® Workstation ready

e-business tools

	mobility	price	speed	bytes	options
ThinkPad® 560	4.2 lbs† 1.2" thin	$2,799*	mobile Pentium® II processor 300 mhz	6.4gb hard drive 64mb memory	external cd drive port replicator

e-business tools

thinkpad.road trip



IBM®

www.ibm.com/thinkpad or 800 426 7255, ext. 5029